Reid Vapor Pressure Regulation of Gasoline 1987-1990

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Contents

I. Abstract

Although it is generally only a summertime problem, smog, as represented by its criteria pollutant, ozone, is currently the number one air pollution problem in the United States. Major contributors to smog formation are the various Volatile Organic Compounds (VOC's) which react with other chemicals in the atmosphere to form the ozone and other harmful chemicals known as smog. Gasoline is a major source of VOC's, not only as it is burned in car engines; but as it evaporates. Gasoline evaporates in storage tanks, as it is transferred during loading and refueling operations, and in automobiles, both while they are running and while parked in the driveway.

In 1987, the United States Environmental Protection Agency began an almost unprecedented effort to reduce the evaporative quality of commercial gasolines by mandating reductions in its Reid Vapor Pressure (RVP). Reductions will occur in two stages. the first began in 1989, and the second will follow in 1992.

This paper analyzes the role of VOC's in smog formation and the manner in which gasoline contributes evaporative emissions to the inventory of VOC's in the atmosphere. The adjustments in refining methods necessary to reduce gasoline vapor pressures, their implications, and the problems posed by the structure of the gasoline market are also discussed. Then a summary of California and other state RVP programs

prior to EPA's 1987 rulemaking is followed by a description and analysis of the federal Phase I program which took effect in 1989. In Part VIII, state use of State Implementation Plan revisions to reenter the RVP regulation field after Phase I's federal preemption of their regulatory authority is discussed. Then the substance of the just promulgated federal Phase II program is analyzed, including its reliance upon a different philosophical approach from its predecessor. The paper concludes with an analysis of the projected costs and benefits of Phase II, including the implications of the pending (as of July 1990) Clean Air Act Amendments.

II. Nonmethane Hydrocarbons as a Contributor to Ozone

Photochemical oxidation occurs as a natural phenomenon. During a walk through a forest, hikers may smell the fragrance of the pines and other trees that are emitting organic vapors. These organic vapors react with the oxygen and suspended water molecules in the atmosphere to form a haze composed of the water droplets and small particulate organic compounds.[1]

Today, in much of the country, natural haze is mere background for the "smog" caused by man's dependence on the

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[1]Natural haze of this type led to the christening of a section of the southern Appalachians as the "Smoky Mountains" long before the onset of the Industrial Revolution. W. SPROULL, AIR POLLUTION AND ITS CONTROL 24-25 (2d ed. 1972).

internal combustion engine and fossil fuels. Coal, natural gas, and all petroleum products are composed of various molecular combinations of hydrogen and carbon atoms. Our reliance on these fuels leads to the release of vast quantities of hydrocarbon molecules into the air.[2]

Hydrocarbons may be divided between methane and nonmethane hydrocarbons:

Methane is chemically inert, is naturally found in the air, and has generally not been considered to be an air pollutant.[3]

In contrast, nonmethane hydrocarbons, [NMHC's] are chemically reactive. Nonmethane hydrocarbons are also called volatile organic compounds [VOC's]. No adverse health effect has ever been demonstrated by human exposure to the levels of reactive hydrocarbons measured in the atmosphere of even our most polluted cities;[4] nonetheless, volatile organic compounds have been a target of air pollution regulation because they

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[2]Dispersed natural sources still generate about 77.7% of all ozone precursors. Williams, *U.S. Refiners May Face Gasoline Supply Crunch in Driving Season*, OIL & Gas J. 23, 24 (June 5, 1989)(quoting Jerrold Levine, Assistant Director of Corporate Studies AMOCO Oil, and U.S. EPA data).

[3]P. CRONE, *The Pollutants*, in 6 AIR POLLUTION 23 (A. Stern editor 3d ed. 1986). Since methane is a "greenhouse" gas and may contribute to global warming, this historic lack of concern is changing.

[4]CONSERVATION FOUNDATION, A CITIZEN'S GUIDE TO CLEAN AIR 86 (1972).

are essential building blocks in the formation of the various photochemical oxidants found in smog.[5]

The photochemical oxidants within smog include ozone (O_3) and various peroxyacetylnitrates (PAN). Their name, "photochemical oxidants", describes their qualities. As the suffix, "-chemical" implies, these pollutants are formed by the chemical interaction and reaction of other "precursor" pollutants. The primary smog precursor pollutants are the various volatile organic compounds plus nitrogen dioxide (NO_2) and other oxides of nitrogen (NO_x). VOC's react with each other, with NO_2 and NO_x molecules, and with hydroxyl (OH) radicals normally found in the atmosphere. These reactions are spurred by sunlight ("photo"). Once formed, ozone and PAN molecules are themselves extremely reactive oxidizing agents ("oxidants").[6]

Since ozone and the other components within smog are created only as VOC and NO_x molecules encounter and then react with each other under strong sunlight, there is a strong temporal aspect to smog formation. The chemical reactions leading to O_3 and PAN formation are hot weather phenomena, and even on the hottest summer day, the setting of the sun brings the chemical reactions to a stop. Figure 1 demonstrates the

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[5]P. CRONE, supra note 3, at 23.

[6]A CITIZEN'S GUIDE TO CLEAN AIR, supra, note 4, at 85.

seasonal nature of the ozone problem:[7]

1986-88 Nationwide Ozone Exceedances
(Excludes California and Houston)

Period	Number/Exceedances	Percentage
Jan 1-15	0	0.0
Jan 16-31	2	.1
Feb 1-15	1	.1
Feb 16-28	1	.1
Mar 1-15	5	.3
Mar 16-31	6	.3
Apr 1-15	2	.1
Apr 16-30	35	1.9
May 1-15	26	1.4
May 16-31	154	8.2
Jun 1-15	147	7.8
Jun 16-30	352	18.7
Jul 1-15	303	16.1
Jul 16-31	379	20.1
Aug 1-15	284	15.1
Aug 16-31	121	6.4
Sep 1-15	34	1.8
Sep 16-30	15	.8
Oct 1-15	6	.4
Oct 16-31	8	.4
Nov 1-15	0	0.0
Nov 16-30	1	.1
Dec 1-15	1	.1
Dec 16-31	1	.1
	1884	100.0

Figure 1

VOC's and NO_x must be the primary targets of any program to reduce smog. As highlighted in the current television advertising campaign of a major ethanol producer, carbon monoxide (CO) also acts as a precursor to smog formation, but the same sunny, hot weather conducive to smog formation

[7]U.S. ENVIRONMENTAL PROTECTION AGENCY, FINAL REGULATORY IMPACT ANALYSIS AND SUMMARY AND ANALYSIS OF COMMENTS: PHASE II GASOLINE VOLATILITY REGULATIONS Table 2-1 at p. 2-4 (May 1990)[hereinafter FRIA: PHASE II REGULATIONS].

actually discourages the production of CO. Carbon monoxide is a product of incomplete combustion. In addition to a badly tuned engine, its formation is fostered by high altitudes and/or cold temperatures. The almost unprecedented heat waves in the summer of 1988 generated record breaking smog episodes; yet in the same year ambient levels of carbon monoxide actually fell 3%.[8]

Smog weakens rubber[9] and fabrics, and is an irritant to the eyes and lungs. Acute smog episodes can pose major health risks to asthmatics and other persons with pre-existing respiratory problems. It may lower resistance to disease in healthy populations.[10] As it is transported by the wind, it impacts areas far beyond the urban sprawl with which it is usually associated. Smog is toxic to plants. It may cause crop damage in excess of one Billion dollars per year, and

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[8]CO levels have been reduced by a total of 28% since 1979. *No Air Quality Improvement in 1988, EPA's Latest Air Trends Report Indicates*, 20 Env't. Rep. (BNA) No. 50, at 1966 (April 13, 1990)[quoting U.S. ENVIRONMENTAL PROTECTION AGENCY, NATIONAL AIR QUALITY AND EMISSIONS TRENDS REPORT 1988 (April 5, 1990)].

[9]The recurrent smog problems in Los Angeles caused such problems, tire companies locally marketed specially formulated "crack-resistant" tires. W. SPROULL, *supra* note 1, at 28.

[10]Notice of Proposed Rulemaking, *Regulation of Fuels and Fuel Additives: Volatility Regulations for Gasoline and Alcohol Blends Sold in 1989 and Later Calendar Years and Control of Air Pollution From New Motor Vehicles and New Motor Vehicle Engines: Evaporative Emissions Regulations for 1990 and Later Model Year Gasoline-Fueled Light-Duty Vehicles, Light-Duty Trucks, and Heavy-Duty Vehicles*, 52 Fed. Reg. 31,274, 31,275 (proposed August 19, 1987)[hereinafter Proposed Rulemaking]; *and see*, A CITIZEN'S GUIDE TO CLEAN AIR, *supra* note 4, at 86.

imposes additional indirect costs as weakened plants demand more water, fertilizer and cultivation.[11]

Because of the problems caused by smog, it is a target of Clean Air Act regulation. Rather than attempt to regulate all the myriad of photo-reactive chemical components within smog, one representative component, ozone, is designated as a criteria pollutant. The primary ozone one hour standard is .12 parts-per-million.[12] Ozone exceedances have been the most significant cause for listing Air Quality Control Regions as "Nonattainment". Any area which has more than 3 days in a three year period with ozone levels exceeding standards is listed as Nonattainment. The hot summer in 1988 put dozens of additional areas out-of-compliance. For the three year period of 1986-88, a total of 101 metro areas were designated as nonattainment for ozone.[13]

Oxides of nitrogen, in addition to contributing to ozone and smog formation, also pose health risks of their own. The Clean Air mandates their listing as a criteria pollutant.[14]

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[11]*More Stringent Long-Term Ozone Standard May be Proposed to Protect Crops, Official Says*, 18 Env't. Rep. (BNA) No. 32, at 1805-06 (December 4, 1987).

[12]40 C.F.R. § 50.12 (1989).

[13]M. Woolcott, Volatility Regulation for Gasoline and Alcohol Blends Sold in Calendar Years 1992 and Beyond 1 (June 6, 1990)(available in U.S. EPA Docket A-85-21).

[14]42 U.S.C. § 7409(c) (1989); 40 C.F.R. § 50.12 (1989). Atmospheric NO_x reduces visibility and can irritate and damage lung tissue, making exposed persons and livestock susceptible to bronchitis and other diseases; it can destroy or weaken plant tissue and reduce vegetative growth rates. Nitrate

VOC's do not qualify under the Clean Air Act for treatment as criteria pollutants.[15] Nonetheless, because of their contribution to ozone and smog formation, VOC's are regulated as "semi-criteria" pollutants.

Some progress has been made in reducing NO_x and ozone levels over the years. Over time, gains made tend to be nullified by increased population, consumption, and vehicle miles traveled. In the ten year period through 1987, NO_x was cut 12%, then reductions stopped. Ozone levels were cut 16%, but then rose 5% in 1987.[16] The unusually hot summer of 1988 increased peak ozone levels by 8% and NO_2 levels by 1%.[17] The number of ozone nonattainment areas increased to over 100.[18]

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salts formed from NO_x are corrosive to metals. A CITIZEN'S GUIDE TO CLEAN AIR, supra note 4, at 87.

[15]"Hydrocarbons" were listed as a criteria pollutant in 1970. They were delisted after scientific studies proved their lack of health related impacts. A criteria pollutant must "...reasonably be anticipated to endanger public health or welfare." 42 U.S.C. § 7408(a)(1)(A) (1989).

[16]*Urban Air Quality Continues to Improve, but Ozone, CO Levels too High, EPA Reports*, 19 Env't. Rep. (BNA) No. 47, at 2518 (March 24, 1989).

[17]*No Air Quality Improvement in 1988, EPA's Latest Air Trends Report Indicates*, supra note 8, at 1966.

[18]A map displaying the location of these nonattainment areas is found at Appendix I. In 1987, 101.8 million Americans lived in counties exceeding at least one NAAQS. Listed in order of severity, exposures included:

Ozone	88.6 million
Carbon monoxide	29.4 million
Particulates PM_{10}	21.5 million
Oxides of Nitrogen	7.5 million
Lead	1.7 million

The chemical reaction of NO_x and VOC molecules may occur many miles downwind from the sources of their emissions. In the mid-1980's, the Environmental Protection Agency tracked the flow of a "plume" of smog as it moved from New York City. By early morning the plume had reached southern New England; by mid-day central New England, Cape Cod and Western Massachusetts; by late afternoon the plume had reached Northern New England states.[19] In 1988, Maine was detecting ozone levels as high as 2.0 ppm at *Isle au Haut*, an island portion of the Acadia National Park, located over twenty miles due east of the mainland.[20] A 1987 New York Department of Environmental Conservation study concluded that New Jersey could stop all VOC and NO_x emissions for one day, and still remain non-attainment for ozone (smog) due to transport of smog and smog precursors into the state on the prevailing southwest winds.[21]

Sulphur Dioxide 1.6 million.
OFFICE OF AIR QUALITY, U.S. EPA, NATIONAL AIR QUALITY AND EMISSIONS TREND REPORT 1987, at 3-5 (March 1989).

[19]House Committee on Energy and Commerce, Subcommittee on Health and Environment, *Testimony of John Elston, Assistant Director Air Quality Management and Surveillance, New Jersey Department of Environmental Protection on Behalf of NESCAUM*, 101st Cong. 1st Sess., at 2 (February 28, 1989).

[20]*State Board Adopts Regulations to Reduce Gasoline Volatility in Summer to Control Ozone*, 19 Env't. Rep. (BNA) No. 16, at 705 (August 19, 1988).

[21]Testimony of John Elston, supra note 19, at 3.

III. Gasoline Evaporative Emissions

A. Scope of the Problem

In preparation for its announcement of Phase II Gasoline Volatility Controls, EPA prepared this consolidated inventory of VOC emissions in its 1987 Ozone Nonattainment Areas.

1987 Non-Northeast Nationwide Urban Ozone
Nonattainment Area VOC Emissions Inventory

Source Category	VOC Emissions (1000 tons)
Light Duty Gasoline Vehicles LDGV	3743.3
Light Duty Gasoline Trucks LDGT	912.6
Heavy Duty Gasoline-Fueled Vehicles HDGV	215.1
Diesel Powered Vehicles DSLV	93.7
Area Sources	4427.7
Point Sources	1183.4
Total	10575.8

Figure 2

A startling 46% of VOC emissions are linked to gasoline powered vehicles.[22]

In automobile engines, a spark is applied to a fine spray of atomized gasoline mixed with air; the resulting combustion driving the cylinders. (In diesel engines, cylinder-compression heat ignites the fuel). Ideal, or "stoichiometric" combustion requires mixing about 15 grams of

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[22]Seventy non-Northeast Nonattainment areas were included, including 10 in California. The eight Northeastern states (New England plus New Jersey and New York) were excluded because most of them had already adopted an RVP program equivalent to EPA's Phase II program. The eight Northeastern states fraction of United States gasoline consumption is about 16%. FRIA: PHASE II REGULATIONS, supra note 7, at pp. 3-29, 4-11 (May 1990).

air with each gram of fuel burned. Complete combustion produces Carbon dioxide (CO_2), water vapor (H_2O), and nitrogen (N_2) or oxides of nitrogen (NO_x).[23]

The chemical composition of the fuel used has little impact on the amount of NO_x emitted. To reduce NO_x, the engine has to be "detuned" by lowering combustion temperature or lowering the ratio of air to fuel. The incomplete combustion which results adds carbon monoxide and unburned hydrocarbons, including volatile organic compounds to the exhaust stream. As air and heat are added back into the mixture, combustion becomes more stoichiometric and these "Products of Incomplete Combustion" (PIC's) are reduced. Unfortunately, "leaning" the fuel in this fashion increases the production of NO_x.

In practice, VOC reduction is easier than NO_x reduction, and has been the preferred target in ozone reduction strategies. It is easier to adjust the combustion and the exhaust process to remove VOC's than it is to reduce NO_x. Furthermore, unlike NO_x, altering fuel content can reduce VOC emissions.

Combustion is not a prerequisite for gasoline to be an air pollutant. To a varying degree, gasoline "...is a liquid that wants to become a gas." VOC molecules in gasoline can evaporate directly into the atmosphere. In 1970, about 11.4% (4 million tons) of total hydrocarbon air pollution was

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[23]As the combustion temperature is increased, N_2 is replaced by NO_x,

attributed to gasoline (and solvent) evaporative loss. An EPA source described evaporation as only a "Miscellaneous" source of hydrocarbons.[24] As exhaust emissions controls have improved, the relative significance of gasoline's evaporative losses has increased.

B. Gasoline Marketing and Evaporative Emissions

The rate at which gasoline evaporates is a function of site altitude and temperature, the chemical composition of the gasoline, and the "emissions proof" qualities of the equipment and methods used to store and transport it.

[1] Gasoline Evaporative Emissions Controls

Regulations limiting the vapor pressure of gasoline are affected by limitations imposed by the manufacturing, storage, and transportation processes used in the industry, including some processes used to limit emissions. The petroleum industry has been divided into three separate stages: production, refining, and marketing. Since passage of the Clean Air Act, extensive effort has been expended in reducing evaporative emissions at each stage of the market process.[25]

The major sources of volatile organic compound evaporative emissions at both the wellhead (production) and

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[24]J. CAVENDER, D. KIRCHER, & A. HOFFMAN, NATIONWIDE AIR POLLUTION EMISSION TRENDS 1940-1970 25 (1973).

[25]Hustvedt, McDonald, Markwordt & Shedd *Process Emissions and Their Control: Part II, The Petroleum Industry*, in 7 AIR POLLUTION CONTROL 438-39 (A. Stern editor 3rd ed. 1986).

during the refining process are leaking seals and valves in processing equipment. A "typical" refinery could emit 80 to 500 megagrams of VOC's per year via leaking gaskets, valves and seals. Evaporative losses have been reduced through use of "floating roof" storage tanks instead of fixed roof tanks; through redesigned seals and valves; and through use of pressure relief devices and controlled venting of vapors.[26]

The marketing stage includes the transport of the gasoline from the refiner to the retailer and then its delivery to the customer in his automobile or truck. Refineries deliver their products to regional storage facilities, or *bulk terminals*. From there, distribution is made to an intermediate distribution point, called a *bulk plant*, or directly to the retailer (gas station).[27]

Each step in the marketing process requires loading fuel from one tank into another. Each loading operation is a potential source VOC emissions: filling the tank with fuel displaces the air present in the tank. Gasoline molecules mixed in that air can escape with it to pollute the atmosphere. Emissions are reduced by "submerged loading"

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[26] *id.* at 447-52.

[27] *id.* at 453. Bulk terminals are often described as "tank farms". Depending on location, terminals may receive gasoline via pipeline, tankers or barges, and by train. Bulk plants are distinguished from bulk terminals by their limited storage capacity (under 50,000 gallons) and the limited means by which they receive gasoline (tank trucks and railroad cars). Jack Faucett Associates, Petroleum Storage and Transit Times (Final Report) 10 (September 26, 1986)(available in U.S. EPA Docket A-85-21 as Document II-A-31).

which is used at all stages of the marketing industry. Fuel is pumped in and out of storage tanks from near their bottom instead of being "splash loaded" from their top.[28] Submerged loading reduces the surface turbulence of gasoline in the tank which reduces the amount of gasoline vapor mixing in the air.

Even after submerged loading operations, the displaced air will still contain some hydrocarbon molecules. The air may be vented into a special carbon absorber vapor recovery control system, or if recoverable quantities of hydrocarbons are uneconomic, the vent can lead to a "thermal oxidizer" or flare to be burned-off. With efficient combustion, thermal oxidizers can reduce VOC emissions by 98%.[29]

The reduced turbulence, reduced vapor emissions benefit of submerged loading has a "downside." Submerged loading aggravates the tendency of different types of gasoline to remain stratified within a storage tank. In the spring, when the industry must reduce the RVP of the gasoline in its tanks prior to the summer RVP enforcement dates, the lighter high RVP winter grade gasoline tends to remain in a layer near the top of the tanks as heavier, summer grade, low RVP gasoline is added at the bottom.

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[28]Gasoline is usually not introduced or withdrawn through the very bottom of the tank. After it has been in operation for an extended period, the layer(s) of gasoline in the tank will float upon a layer of water and sediment which gradually collects at the bottom of the tank.

[29]Hustvedt, McDonald, Markwordt & Shedd, *supra* note 25, at 456.

To reduce vapor emissions, gasoline is removed as well as added from the lower part of the storage tanks. Since few storage tanks have any mixing capacity, "inventory" is removed on something of a "Last-in, First-out" basis. Nor can an operator simply pump out all the high RVP gasoline before adding summer grade gasolines: Although most storage tanks have floating roofs, five to ten feet from their bottom, the roofs rest on stilts. Unless a tank needs extraordinary maintenance, sufficient gasoline is kept in it to keep the roof floating above the stilts. This avoids structural stress, and eliminates both the emissions and fire hazard of the residual vapors that would be left in the tank.[30]

An operator facing the possible sanctions of an RVP regulation can only be assured of meeting the standard by repeatedly adding and removing low RVP gasoline from his tanks prior to the initial enforcement date of the regulation.[31] As the disparity between the RVP of winter and summer grade gasolines increases, so does the number of loads of low RVP

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[30]American Petroleum Institute, Transportation and Storage Times of Motor Gasoline 3-4 (1988)(available in U.S. EPA Docket A-85-21).

[31]Testimony of Joe T. McMillan on behalf of the American Petroleum Institute, before the U.S. EPA hearings on Volatility Regulations for Gasoline and Refueling Emissions 12-14 (October 28, 1987).

gasoline necessary to "blend down" the tanks' contents[32] and the time needed to bring storage tanks into compliance.[33] Operators may try to cut transition time and the number of "turns" required by allowing their tanks of high RVP fuel to be drawn down as far as possible, and then adding extra low RVP fuel set as far below the government's summer standard as practicable. This approach amplifies the risk of distribution choke points and shortages as refiners first cut inventory (of high RVP gasoline), and then rush to manufacture and transport low RVP fuel throughout the distribution system.[34]

Bulk deliveries of gasoline to service stations have been regulated by so called "Stage I" controls. The underground storage tanks at gas stations are fixed roof. Emissions during their refilling are controlled via vapor balance systems. As the storage tanks are filled, the air and vapors displaced as gasoline is added are vented into the delivery

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[32]For example to blend down a half tank of 13.5 psi gasoline down 1 psi to 12.5 psi could take X loads of 12.3 gasoline. To blend down the same tank of 13.5 psi gasoline 2 psi to 11.5 psi would require 2X loads of 11.3 gasoline. Transportation and Storage Times of Motor Gasoline, supra note 30, at 5.

[33]Letter from J.N. Sullivan, Vice-President Chevron Corp. to Lee M. Thomas, Administrator U.S. EPA 2 (October 10, 1988).

[34]Statement of B.M. Harney, Mobil Oil Corporation, at public hearing of the New York State Department of Environmental Conservation on Proposed Air Pollution Control Regulation 6 NYCRR Subpart 225-3 "Fuel Composition and Use--Motor Fuel" 4 (March 2, 1989).

truck's storage tank.[35]

Refilling an automobile's tank also displaces vapors. Gas stations can use vapor balance systems, or install improved vacuum assisted systems, or use hybrid systems to reduce these emissions up to 95%. As the vehicle's tank is filled with gasoline, each of these "Stage II" systems vents the displaced vapors from the vehicle's tank into the service station's storage tank.[36]

[2] How Refiners Adjust Volatility

As it is pumped from the ground, crude oil could be compared to a soup containing many different types of molecular hydrocarbon chains. The three basic types of crude oil are *paraffin* base, *napthene* base, and *mixed* base. Paraffin base crude contains a relatively high percentage of open chain hydrocarbons, which may be saturated (-alkanes), or unsaturated (eg. olefins). Napthene based crude contains a high percentage of cyclic/closed chain hydrocarbons, and are highly aromatic. Mixed base crude contains a mixture of both open chain and closed chain hydrocarbons. Pennsylvania crude is likely to be paraffin base; Texas and Louisiana oil is napthene base; and Illinois produces mixed base crude.[37] The type of crude oil supplied to the refinery may limit the

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[35]Hustvedt, McDonald, Markwordt, & Shedd, *supra* note 25, at 457-58.

[36]*id.* at 457-59.

[37]H. HESKETH, UNDERSTANDING & CONTROLLING AIR POLLUTION 136 (1972).

types and quantity of gasoline a refinery can produce.

At the refinery, crude oil is placed in a distillation column and subjected to heat. Different hydrocarbon compounds display differing characteristics; generally, the shorter carbon chains contain more hydrogen and have lower boiling points.[38] With fewer carbon atoms, these compounds are relatively light, and burn (or evaporate) most easily. Natural, "straight-run" gasoline compounds are among these more volatile compounds, and generally comprise about 15% of the crude oil "soup".[33] Simply distilling straight gasoline from its crude petroleum base would be grossly insufficient to meet the demands of the market. About 63% of the petroleum market is for motor fuel; and nearly 75% of the motor fuel market is for gasoline.[40]

To meet this demand, refineries must supplement their distillation of straight gasoline by applying additional processes to the various heavier and lighter hydrocarbon fractions obtained through distillation. The naphtha fraction is routed to a reformer, where it is upgraded into a high octane substance called reformate. The longer, heavier, non-gasoline carbon chains [called "residue"] are routed to vacuum towers and catalytic "crackers" where the long carbon chains are broken into shorter chains of six to eleven carbon

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[38]H. HESKETH, AIR POLLUTION CONTROL 61 (1979).

[33]*id.* at 71.

[40]*id.* at 70.

molecules in length. The resulting product is "cat gasoline", a major component of commercial gasoline. Short chains under 6 carbon molecules in length can be combined to form gasoline length molecules through a process called polymerization. This fraction is called alkylate.[41] When all these "process streams" are mixed, a typical crude oil may have provided a gasoline fraction as high as 56%.[42]

A representative formula for gasoline is C_8H_{18}; but refined gasoline is itself a "soup" of dozens of species of hydrocarbon chains with boiling points ranging from about 100 to 400 degrees Fahrenheit. Gasoline hydrocarbons may be divided between *saturated* (containing the maximum possible number of hydrogen atoms) and *unsaturated* (all other) hydrocarbons. The more unsaturated the hydrocarbon, the more reactive it is, and the greater its potential role in smog formation. Aromatic compounds, as their name implies, are unsaturated, and leave a strong aroma as they react with molecules in the atmosphere. Benzene, C_6H_6, is a typical aromatic compound.[43] Refineries may add hydrogen in order to saturate the carbon molecules. The table at Appendix II provides an example of the variety of compounds in commercial

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[41]H. HESKETH, *supra* note 37, at 137-38; and Poten & Partners, Review of U.S. Northeast Gasoline Suppliers 2 (1989).

[42]H. HESKETH, supra note 38, at 72-73.

[43]H. HESKETH, supra note 37, at 83-84.

gasoline; and it also demonstrates the great variation which refining adjustments can make in the molecular composition of gasoline refined from the same stock of crude petroleum.

The different components in the "soup" of gasoline hydrocarbons have varying volatilities. The shorter, lighter hydrocarbon chains are the most volatile and make up a disproportionate share of the gasoline vapor. Historically, the single most prevalent compound found in gasoline vapor has been butane. Chemically, with only four carbon atoms, butane is not actually "gasoline." Light gases, including propane (C_3), and butane (C_4), are among the by-products produced during the refining process. Butane is produced by as many as seven of the different "process streams" which contribute to commercial gasoline.[44]

Normally, gasoline refiners draw-off and remove as much propane (and any lighter gases present) as possible. Until the advent of federal volatility regulation in 1989, refiners had little incentive to remove butane. Butane had little market value of its own. For refiners, it had greater economic value as a "filler" mixed with commercial gasoline than it did sold separately.[45]

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[44]*Volatility Limit of Gasoline Lowered During Summer Months Beginning in 1992*, 21 Env't. Rep. (BNA) No. 6, at 311 (June 8, 1990)(quoting J. Williams, Senior Refining Associate, American Petroleum Institute).

[45]Proposed Rulemaking, supra note 10, at 31,278.

[3] The Role of High Volatility Compounds in Gasoline

One advocate of government imposed reduction in Reid Vapor Pressure has claimed the oil companies like high volatility gasoline because "...it is cheaper to make and you have to buy gas more often [due to its high rate of evaporation]."[46] Butane is cheaper than gasoline, but the industry practice of leaving it mixed in gasoline was not just a matter of diluting their product, or "watering the stock". Butane has performance benefits that can make its blending with commercial gasoline desirable to consumers.

Gasoline volatility may effect engine performance. For cold weather starts, gasoline must be sufficiently volatile to provide enough vapor in the cylinders to allow ignition. In warm climates, or at high altitudes,[47] a fuel whose volatility is too high may vaporize within the fuel system before reaching the cylinders, causing "vapor lock". For years, refiners used adjustments in the butane fraction of their gasoline as a ready means of seasonally adjusting fuel

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[46] *State Board Adopts Regulations to Reduce Gasoline Volatility in Summer to Control Ozone*, 19 Env't. Rep. (BNA) No. 16, at 705 (August 19, 1988)(quoting Dean Marriot, Commissioner, Maine Department of Environmental Protection).

[47] A 4500 feet increase in altitude is equivalent to a + 1.3 psi increase in Reid Vapor Pressure. A car using 10.1 psi gasoline at 70°F in San Antonio (700 feet elevation) will have performance equivalent to a car using 8.8 psi gasoline at 70°F in Denver (5200 feet elevation). U.S. ENVIRONMENTAL PROTECTION AGENCY, DRAFT REGULATORY IMPACT ANALYSIS: CONTROL OF GASOLINE VOLATILITY AND EVAPORATIVE HYDROCARBON EMISSION FROM NEW MOTOR VEHICLES (1989)(available in U.S. EPA Docket A-85-21).

volatility.

Butane has a Reid Vapor Pressure five to nine times greater than the major components of commercial gasoline. (Reid Vapor Pressure, or RVP, measures the tendency of a liquid to evaporate at 100^{0}F).[48] Just a small amount of butane can turn otherwise involatile and thus unusable gasoline components into a volatile mixture. Figure 3 illustrates the effect of removing butane from common gasoline fractions.[49]

Component	Market Quality [RVP]	Debutanized
Cat gasoline	7-9 psi	4.0 psi
Alkylate	7-10 psi	4.0 psi
100 RON reformate	9-10 psi	5.5 psi

Figure 3

Octane is a measure of a fuel's resistance to ignition through compression. An engine "knocks" when compression of the air/fuel mixture causes gasoline to ignite in a cylinder prematurely, that is prior to the firing of the cylinder's spark plug. The higher a fuel's octane, the farther the piston can move in its compression phase without igniting the fuel, and the more work the piston will perform when the fuel is ignited.

Since 1980, many factors have contributed to a consumer

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[48]Reid vapor pressure is not true vapor pressure because a small amount of the gasoline evaporates during the collection procedure, and water vapor and air may be included with the sample. AMERICAN SOCIETY FOR TESTING AND MATERIALS, STANDARD TEST METHOD FOR VAPOR PRESSURE OF PETROLEUM PRODUCTS (REID METHOD) D 323-82, n.1 (1982).

[49]Poten & Partners, supra note 41, at 2.

demand for higher octane fuels. After the oil shocks of the 1970's, consumer demand for large cars revived. Larger cars can demand higher octane fuels.[50] In many new car engines, after 15,000-20,000 miles, carbon deposits accumulating in the combustion chamber can boost an engine's demand for octane by 4-5 numbers. About 40% of 1988 model cars (and 15% of the total fleet) have knock sensors in their engines. As these sensors adjust the engine for knock, the engine's acceleration and mileage may be cut.[51] A natural consumer reaction to these adjustments is fuel-switching to premium grades. Also petroleum companies have aggressively advertised premium grades of gasoline because of their higher profit margin.[52]

Since refiners were required to remove lead from gasoline, they have been adding highly volatile components such as butane to their gasoline as a means of maintaining high octane levels in the fuel.[53] This trend has been accelerated by a steady increase in the average octane of the

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[50]Unzelman, *Reformulated Gasolines Will Challenge Product-Quality Maintenance*, OIL & GAS J., April 9, 1990 at 43.

[51]Williams, *U.S. Refiners May Face Gasoline Supply Crunch in Driving Season*, OIL GAS J., June 5, 1989 at 23, 25.

[52]Unzelman, *supra* note 50.

[53]The reader is cautioned that high volatility components do not always possess high octane: and some high octane components have low volatilities (e.g. toluene has an RVP as low as 1 psi and an octane of 104). *U.S. Toluene Prices Skyrocket as Gasoline Blending Demand Rises*, 9 INTERNATIONAL PETROCHEMICAL REPORT No. 18, at 3 (May 2, 1990).

gasoline pool[54] combined with the increasing consumer demand for high-octane premium grades of gasoline.

Refiners have routinely added extra butane to their commercial gasoline mixture in order to raise its vapor pressure (and volatility), especially during the winter driving season. In recent years, so much additional butane has been used as a gasoline additive, in addition to the butane simply left in the gasoline process streams, refiners were augmenting their own supplies with purchases of butane from the Natural Gas Liquids [NGL] industry.[55]

Customarily, refiners have reduced butane content in warm weather to reduce fuel loss through evaporation, nonetheless, the butane which remained has still been a major contributor to smog. For example, a gasoline with a Reid Vapor Pressure of 11.5 psi might have a 5% butane component. With this RVP, as much as 1% or 2% of the gasoline in an automobile's tank is expected to evaporate on a hot day. Most of that evaporative loss will be from the butane component mixed with the gasoline. In hot weather, some 20-40% of the butane added to raise RVP may never reach the engine's

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[54]In 1980, the average octane of the unleaded gasoline pool was 83, by 1989 it was 88.5. Unzelman, supra note 50, at 44.

[55]Gasoline refiners relied upon NGL producers and other outside sources for about 20% of their butane requirements. Proposed Rulemaking, supra note 10, at 31,296.

cylinders due to its prior evaporation.[56]

The cheapest way for a refiner to reduce gasoline Reid Vapor Pressure is simply not to add extra butane. Reductions below the 10.0/9.0 psi range require adjustments in a refiner's equipment, processes and/or type of crude oil in order to reduce or remove the butane produced by the production of the gasoline itself. If the reductions in vapor pressure are deep enough, pentanes or even heavier components may also have to be removed.[57]

The law of diminishing returns can apply to RVP reduction. Depending upon the method used, it may cost a refiner 3.5 times as much money to reduce RVP from 8.0 psi to 7.0 psi, as it does to reduce it from 11.5 psi to 10.5 psi.[58] Reducing RVP from 11.5 to 10.5 psi may achieve 80% of the evaporative VOC reduction accomplished by a reduction from

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[56]Notice of Final Rulemaking, *Volatility Regulations for Gasoline and Alcohol Blends Sold in Calendar Years 1989 and Beyond*, 54 Fed. Reg. 11,868, 11,882 (March 22, 1989)[hereinafter Final Rulemaking-Phase I] Whatever its Reid Vapor Pressure when it is dispensed at the service station, fuel evaporation is not a "steady state" process. As butane in the fuel evaporates, the RVP of the gasoline remaining in the vehicle tank is reduced; and the rate of evaporation slows until the tank is refilled. The proper modeling of this "weathering" process was a controversial aspect of both the Phase I and Phase II rulemaking. FRIA: PHASE II REGULATIONS, supra note 7, at p. 3-20.

[57]Once the butane is gone, the volume of volatile components requiring removal increases dramatically; e.g., "[F]our times as much pentane must be removed, compared to butane, to reduce RVP one psi." Letter from L.D. Thomas, President, AMOCO Oil Co. to Lee Thomas, Administrator, U.S. EPA (September 28, 1988).

[58]Letter from J.N. Sullivan, supra note 33, at 1.

11.5 to 9.0 psi; yet it may cost only 40% as much.[59]

Proponents of the severest reductions in RVP argue government imposition of a 9.0 psi standard merely returns the oil industry to the same voluntary levels it used at the start of the 1970's. Although the RVP levels might be the same, the 9.0 psi gasoline is not. In 1970, lead additives were the principal means of raising fuel octane. Butane removed in 1990 may not be replaced with lead.[60]

In addition to butane, the percentage of gasoline aromatic and/or olefinic hydrocarbons has been increased to compensate for the octane lost as lead was removed. In the decade from 1980 to 1989, the average aromatic component of gasoline increased from 22% to 32.1% by volume.[61] Butane is a paraffin, and among the least reactive hydrocarbons found in commercial gasoline. Although heavier than butane, and less volatile, aromatics are among the most reactive. As they evaporate, molecule for molecule, they contribute more to smog formation than butane.[62] Some aromatics, such as benzene, are

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[59]Letter from Richard Brescia, New York State Petroleum Council, to Mario Cuomo, Governor, New York State at 4 (July 28, 1988).

[60]*See generally*, 40 C.F.R. §§ 80.20-.26 (1989).

[61]Unzelman, supra note 50, at 44.

[62]H. HESKETH, *supra*. note 37, at 138; See Proposed Rulemaking, *supra*. note 10, at 31,278.

also suspected carcinogens.[63] Others, such as toluene and xylene may be carcinogens. (Even if they are not, if combustion is not complete, their molecules and radicals may combine in the exhaust stream to form benzene).[64] Fortunately, aromatics do not evaporate as readily as butane. A gasoline composed of 35-40% aromatics by liquid volume, may emit vapors whose aromatic fraction is only 1 to 4%.[65]

In its rulemaking EPA has treated all reactive compounds equally, citing three reasons for doing so:

- During the severest, multi-day pollution episodes, a slow reacting VOC will still ultimately contribute to ozone problems, either in the city in which it was emitted, or in downwind areas;
- The modeling of the relative reactivity of various VOC's is dependent on constructing too many

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[63]N. Seidman & D. Ernst, [NESCAUM], *A Gasoline Volatility Strategy for the Northeast*, presented at the APCA International Specialty Conference on the Scientific and Technical Issues Facing Post-1987 Ozone Control Strategies, Hartford, Connecticut (November 16-19, 1987). One EPA study estimated inhalation of gasoline vapors causes about 42 additional cancer deaths each year. Thirty-four among regular customers at self service gas stations operating without vapor recovery systems; six among persons living near gas stations; two from populations living near bulk terminals; and one from residents living close to bulk plants; as reported in, *Gas Vapors May Cause 43 Cancers Per Year, Marketing Study Says as EPA Weighs Options*, 15 Env't. Rep. (BNA) No. 15, at 570 (August 10, 1984).

[64]Unzelman, supra note 50, at 45.

[65]Statement of Jack Freeman, Sun Refining and Marketing Co., before the New York State Department of Environmental Conservation Proposed Rulemaking Hearing: Limitations on the Volatility of Motor Fuel 4 (August 3, 1988).

assumptions for reliable rulemaking;

- There are so many variables in the process of ozone formation, such as weather, VOC to NO_x ratios, and the ratios of various hydrocarbons in different gasolines; it is simply impractical to regulate on a basis of relative reactivities.[66]

[4] Reid Vapor Pressure Sampling and Testing

The testing of gasoline vapor pressure poses a number of challenges, especially as it is adopted in government regulatory programs with enforceable sanctions. In California, the one jurisdiction with a sustained history of rigorous volatility regulation, failure to follow prescribed testing methods has nullified enforcement actions.[67] Care must be exercised throughout the process of collecting, handling, transporting and testing if accurate results are to be obtained; and even then a regulatory program faces confounding factors due to the nature of gasoline itself.[68]

Sampling from storage tanks poses the "confounding" issue

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[66]FRIA: PHASE II REGULATIONS, supra note 7, at pp. 3-34, 3-35.

[67]E.g. People v. Mobil Oil Corp., 143 Cal. App.3d 261, 192 Cal. Rptr. 155 (1983) in which a complaint alleging 2,615 refueling violations at Mobil service stations and seeking a civil penalty of $1,307,000 was dismissed.

[68]Ethanol blends are tested with a distinct method, Gas Chromatography. EPA describes and analyzes issues related to sampling and testing of gasoline in its Proposed and Final Rules Regulating Gasoline Volatility, respectively: 52 Fed. Reg. 31,274, 31,318-40 (August 17, 1987); and 54 Fed. Reg. 11,868, 11,875-77 (March 22, 1989).

of the layered, heterogeneous nature of the gasoline within the tanks. Industry and government regulators use methods to obtain a sample "representative" of the tank's entire contents. In a "running sample," an uncorked can is lowered from the top of the tank to the level of the tanks outlet (3 to 5 feet from the bottom of the tank, and above the layer water and petroleum sediments). The container is then drawn at a uniform rate vertically through the tank, in a manner which leaves the can only 70-80% full as it breaks the surface. An "all levels" sample is similar, except the cork is in the container's opening as it is lowered into the tank, and then is yanked out with a string just before the sampler starts drawing the container to the surface at a uniform rate. Since the lightest compounds in the container will begin volatizing with their exposure to air, containers are capped and sealed immediately. (The 20-30% airspace left in the can allows the capture of most of these vapors if the container is sealed promptly). The sealed containers are immediately placed in ice chests and transported to the lab.

At the lab, the container is kept fully immersed in ice (to insure all gasoline vapors return to liquid form) and then a portion is transferred to an equally chilled "gasoline chamber" which is filled to over flowing and sealed. A chilled "air chamber" is then attached to the gasoline chamber (within 10 seconds or the test is invalid). The gasoline is then poured from the gasoline chamber into the air chamber.

shaken vigorously and immersed in a second bath, this time at 100°F. After at least five minutes, and for every two minutes thereafter, the chambers are withdrawn, shaken vigorously, and a vapor pressure reading is taken from a gauge fixed in the air chamber. Their average becomes the Reid Vapor Pressure, if all values recorded by the analyst are within a set range of the mean. (This check on test validity is called, "repeatability").

All sampling and test equipment has to be thoroughly cleaned, rinsed with distilled water and heat dried prior to each new test or sample, or else petroleum residues or water can confound the test result. Similarly, all containers and seals must be leak proof.

Since each exposure to air entails some loss of volatile components, and sample collection and each subsequent transfer involve some air exposure, each sample is only tested once. Verification of non-complying results in an enforcement action can only be obtained from a second sample, drawn at the same time, from the same source. (This check on test validity is called "reproduceability").

Reproduceability may pose the biggest problem for an enforcement program. Even when the same individual draws two successive running or all-levels samples, the contents of the separate containers may vary as different ratios of VOC compounds are collected in each pull through. They can also vary as different amounts of VOC's escape prior to sealing the

sample can and during the transfers testing requires.

To reduce reproduceability problems, sampling can be conducted shortly after refilling operations at the storage tank. Then, the layering effect has been reduced by the turbulence from the pumping of new gasoline into the tank. To minimize vaporization, collecting samples in the early morning or other cool periods is advisable.

Selecting smaller targets is another method of reducing reproduceability problems. Redirecting sampling to tank trucks leaving bulk terminals and plants will give the regulator a relatively homogenous, though much smaller sample. (The contents are more homogeneous because it will have been drawn from one layer of the tank and mixed by movement of the truck). Retail level sampling should also produce more reproducible samples. Retail samples are usually drawn by filling the sample can from the pump, with nozzle placed flush to the bottom of the can and a steady flow rate to provide "submerged loading" and minimize splashing and vaporization.

Finally, one other method of avoiding reproduceability challenges in an enforcement action is simply taking only one sample.[83]

The justice of any system is dependent on accurate chains of custody and a reliable lab. In 1989 Massachusetts "tested"

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[83]MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION, DIVISION OF AIR QUALITY CONTROL, GASOLINE VOLATILITY REDUCTION PROGRAM: REID VAPOR PRESSURE (RVP) PROGRAM REPORT, SUMMER 1989--THE FIRST YEAR Parts IV and V (December 1989)[hereinafter MASS. PROGRAM REPORT].

its contract laboratory by sending representatives to a retail station, where they drew 20 consecutive samples from one pump. Samples were then paired, and labeled as if they had been drawn from ten different sources. All test results were within the state's 9.0 psi Reid Vapor Pressure limit, but test results ranged from 5.9 to 8.8 psi.[70]

IV. The Market Structure and RVP Regulation

Projections for United States gasoline consumption in the year 2000 have ranged from 60 to 81 billion gallons.[71] America's huge demand for gasoline has spawned an ubiquitous marketing mechanism. In addition to the refineries which make the gasoline, there are approximately:

- 1,500 bulk terminals;
- 15,000 bulk plants;
- 400,000 service stations.[72]

The transit time of gasoline from the refiner or importer, to the bulk plants and terminals, and then to the retailers where it is sold to the end-user has tremendous

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[70] *id.* at 22-24.

[71] Notice of Availability of a Regulatory Strategies Analysis Document for Public Comment, *Regulatory Strategies for the Gasoline Marketing Industry*, 49 Fed. Reg. 31,706, 31,710 (August 8, 1984).

[72] *id.* at 31,710.

relevance to RVP regulation. An EPA commissioned study found the following "representative" transport times:

- Pipeline from Houston to New York: 14-25 days;
- Barge from New Orleans to Fairmont, West Virginia: 15½ days;
- Tanker from Houston to Portland, Maine: 7+ days
- Truck delivery from "typical" bulk terminal to "typical" retail service station: 1-24 hours.[73]

Storage time and the time necessary to clear stocks of high RVP gasoline is obviously another factor relevant to designing an enforcement strategy. As with other businesses, profits in the gasoline distribution business are not made by keeping large stocks of inventory on-hand. An average bulk plant keeps only a 3-4 day inventory of gasoline.[74] During the time of highest demand from May through September, storage times at bulk terminals may average about 12 days; but, unlike the bulk plants, average storage time at the individual bulk terminals varies widely. Bulk terminal storage times depend on the method used to transport gasoline to the terminal. Bulk terminals relying on pipelines may receive new shipments every third or fourth day. Terminals using ocean tankers may receive shipments only once a month and will have much longer

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[73]Jack Faucett Associates, supra note 27, at 4-6.

[74]Id. at 10.

average storage periods.[75]

Some of the greatest variation in storage times is found at the retail level. A high volume urban gas station, or one located on a major interstate highway may receive daily shipments of gasoline. "Average" urban and suburban stations may get shipments every two days or twice a week. Storage time before sale for unleaded regular at a high volume station might be two days. At an average suburban station, turnover for the same product might take a week; for a rural station it might take two weeks. A typical rural, low-volume station may take 31/2 weeks to move its unleaded regular gasoline.[76]

The enforcement level selected also impacts the cost and intrusiveness of the regulatory program. A program which is going to conduct a meaningful level of inspection and testing of the market through the retail level obviously entails more effort and expense for the government than one focused on importers and refiners. Less obvious, but more costly is the steep rise in compliance costs to industry (and ultimately consumers) that marketwide enforcement imposes. The farther "downstream" the government regulates, the earlier in the spring the refiners and importers need to begin producing (more expensive) low RVP gasoline, to insure all "downstream" participants in the market are in compliance by the initial enforcement date.

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[75] id. at 8-9.

[76] id. at 13.

Besides cost, downstream enforcement may have vehicle performance ramifications. To insure all responsible parties are able to meet the demands of the law, refiners may be distributing low RVP gasoline long before the initial enforcement date of any regulation. Low RVP gasoline may remain in the market after the enforcement period ends. This may place low RVP gasoline in consumer automobile tanks during spring and autumn cold weather periods for which it is unsuited.

Finally, programs mandating reduced RVP's exacerbates our growing dependence on imported oil and gasoline. Cutting RVP may reduce the nation's imports of butane, which range from 17.4 to 21.5 million barrels each year.[77] However, the dollar value of these imports is trivial compared to the cost of imported crude oil or refined gasoline.

Throughout the 1980's, American consumption of petroleum increased an average of 2.5-3.0% each year. As consumption increased, domestic production declined. Between 1988 and 1989, domestic production fell by 6.8%. Domestic exploratory drilling has declined, in reaction to low prices and environmental restrictions. In April 1990, there were only 932 operable rotary oil rigs in the United States, compared to 3,970 in 1981. About 25% of United States oil consumption is supplied from one area, the Prudhoe Bay in Alaska.

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[77] 1982-84 statistics *quoted in*, FRIA: PHASE II REGULATIONS, supra note 7, at p. 4-27.

Production in the Prudhoe Bay fields is declining. The Arctic National Wildlife Refuge offers the greatest likelihood of a successful new strike, but it is off limits to exploration, as are two other likely prospects, the coasts of California and Florida.

As demand increased and our domestic production fell during the 1980's, our imports increased. More than half the increase in OPEC exports has been used to meet U.S. demand. Currently, imported oil and oil products are supplying 50% of our demand. In the first quarter of 1990, imports averaged 8.4 million barrels per day. (Compared to 6.3 million barrels per day and 36% import dependence at the time of the 1973 Arab Oil Embargo). By the end of the 1990's, imports could constitute two-thirds or more of our petroleum supply.[78]

V. Industrial Self-Regulation

Long before the federal government was interested in air pollution, the automotive and petroleum industries cooperated with the American Society for Testing and Materials [ASTM] in setting recommended gasoline volatility limits. Industry's concern can be traced to the impact gasoline's volatility has on vehicle performance. A consumer who could not start his

[78] Kaslow, *U.S. Thirst for Oil Harder to Slake*, Christian Science Monitor, May 9, 1990, at 7, col. 1.

car on cold mornings or who suffered vapor lock on hot summer days would likely be dissatisfied with both his car and his brand of gasoline.

The ASTM set its standards using Reid Vapor Pressure, [RVP], which reflects the amount of fuel evaporation at 100^0 Fahrenheit. This temperature is within the range found inside a vehicle's gas tank during the summertime.

Since the 1950's, improvements in automotive design and manufacture helped produce an upward trend in fuel volatility. Manufacturers' increasing use of fuel injected engines had greatly reduced vapor lock from high RVP fuels. Although highly volatile, butane is cheaper than gasoline. Refiners had an economic incentive to take advantage of these more capable engines by adding butane to their gasoline as a filler. In 1970, when ASTM last set its limits for recommended volatility, the RVP of an "average" summertime gasoline was 9.0 psi. By 1987, summertime gasoline volatility was averaging 10.5 psi. Testing of many "in-use" vehicles revealed the volatility of the gasoline in their tanks was actually exceeding the RVP levels recommended by the ASTM.[79] The ASTM classifications were:[80]

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[79]Proposed Rulemaking, supra note 10, at 31,278-79.

[80]*Id.* at 31,278 (August 19, 1987).

ASTM Class	Reid Vapor Pressure
A	9.0 psi
B	10.0 psi
C	11.5 psi
D	13.5 psi
E	15.0 psi

Figure 4

The higher the RVP number, the more volatile the recommended gasoline. Each ASTM Class reflects the needs of different geographic and climatic regions in North America. The intended effect of setting five different standards is uniform engine performance throughout the country, throughout the year. Class A, (lowest volatility) gasoline is recommended for the hottest areas, during their hottest months. Conversely, Class E (highest volatility) gasoline is recommended for use in the northern states during their winter months. Most of the lower 48 United States are designated to receive the moderate climate, Class C gasoline, through all or most of the summer.[81] Excluding California, which has used a distinctive regulatory scheme since the 1970's.[82] the relative demand for the three summer gasoline grades has been:[83]

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[81]The complete ASTM "Schedule of Seasonal and Geographic Volatility Classes" is found at Appendix III.

[82]The subject of Part VI, Section B, *infra*.

[83]American Petroleum Institute, Table: "Percent of Summertime Gasoline Demand", *included with*, J. Cabaniss, Memorandum to Record, Subject: Meeting with API Regarding Gasoline Volatility (February 27, 1990)(available in U.S. EPA

Class C	72%
Class B	26%
Class A	2%

In part, the monthly ASTM classifications for a given state or area are made with an eye toward cold weather startability and driveability. Design values for cold starts are matched to "six-hour minimum temperatures". (A six-hour minimum temperature is the lowest temperature which occurs for six-hours in a 24-hour day). A state or region's ASTM designation is in turn dependent upon its "tenth percentile minimum temperature". For three days each month, the six-hour minimum temperature will be below the design value of the ASTM gasoline designated for that month.[84]

VI. State Fuel Content Regulation

A. Federal Preemption

Since 1970, Section 211 of the Clean Air Act has authorized the Administrator of the Environmental Protection Agency to test, register, control and prohibit any fuel or

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Docket A-85-21 as Document IV-E-36).

[84]Comments of W.J. Koehl, Mobil Research and Development Corporation before the New York State Department of Environmental Conservation Hearings on Proposed Air Pollution Control Regulation 6 NYCRR Subpart 225-3 "Fuel Composition and Use--Motor Fuel" 3 (August 3, 1988).

fuel additive used in motor vehicle engines.[85] Pursuant to its statutory authority, in 1975 EPA listed five "components" of gasoline subject to annual reporting and registration requirements:

> "(1) Hydrocarbon composition (aromatic content, olefin content [and] saturate content)...;
>
> "(2) Polynuclear organic material, sulfur content and trace element content...;
>
> "(3) Reid Vapor Pressure;
>
> "(4) Distillation temperatures (10% point and end point);
>
> "(5) Research octane number [RON] and motor octane number [MON]."[86]

An explicit preemption provision is written into the act:

> [N]o State (or political subdivision thereof) may prescribe or attempt to enforce, for purposes of motor vehicle emission control, any control or prohibition respecting use of a fuel additive in a motor vehicle or motor vehicle engine-
>
> > (i) if the Administrator has found that no control or prohibition...is necessary and has published his finding in the Federal Register, or
> > (ii) if the Administrator has prescribed...a control or prohibition applicable to such fuel or fuel additive, unless State prohibition or control is identical to the prohibition or control prescribed by the Administrator.[87]

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[85] 42 U.S.C. § 7545 (1989).

[86] 40 C.F.R. § 79.32(c) (1989); Requirements, 40 Fed. Reg. 52,009, 52,014 (1975) as amended by Revision of Regulation, 41 Fed. Reg. 21,323, 21,324 (1976).

[87] 42 U.S.C. § 7545(c)(4)(A) (1989).

Neither of these two general exceptions from federal preemption were available to the states until EPA adopted its Reid Vapor Pressure regulations in March, 1989:

- The Environmental Protection Agency never published or even proposed a finding that "no control" of Reid Vapor Pressure is "necessary."
- Apart from the registration requirements, until 1989, EPA's only overt restrictions on fuel content were a series of 1970's restrictions on lead additives.[88] The states could not make use of the second preemption exception, since no federal RVP restrictions existed which could be copied in "identical" state statutes.

Since EPA did not place any limits on Reid Vapor Pressure until 1989, one might think that refiners and importers faced only the RVP registration requirement described above. However, as EPA initiated its rulemaking in 1987, it could review on-going Reid Vapor Pressure programs in about 20 states. While only California had an air quality oriented program, the status of these state programs in 1987 does merit investigation.

B. The California Exception

Since 1970, California has occupied a unique niche in the federal clean air regulatory scheme. In 1970, Congress

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[88] 40 C.F.R. §§ 80.20-.25 (1989).

preempted the regulation of automobile emissions,[29] except for states which were regulating automotive emissions as of 30 March, 1966.[30] California was the only state which had emissions standards in 1966, and has used its waiver to continue to enforce a distinct set of vehicle emissions standards since 1970.[31] California has also been enforcing its own air quality oriented gasoline vapor regulation since the early 1970's.[32] In 1977, Congress retroactively gave explicit recognition and authority to California to regulate gasoline, despite the previous federal preemption of the field:

> Any State for which application of section 7543(a) of this title has at any time been waived under section 7543(b) of this title may at any time prescribe and enforce, for the purpose of motor vehicle emission control, a control or prohibition respecting any fuel or fuel additive.[33]

A 1970 California Air Resources Board [CARB] action

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[29]42 U.S.C. § 7543(a) (1989).

[30]42 U.S.C. § 7543(b)(1) (1989).

[31]California's standards must remain at least as stringent as the federal standard, or the waiver is lost. 42 U.S.C. § 7543(b)(2) (1989). Since 1977, states other than California which are "Non-Attainment" for automotive related pollutants are permitted to revise State Implementation Plans and adopt "California" standards for vehicles sold in their states as a means of reducing those emissions. To date, no state has done so. 42 U.S.C. § 7507 (1989).

[32]CAL. ADMIN. CODE tit. 13 § 2251. R. 70 (1989).

[33]42 U.S.C. § 7545(c)(4)(B) (1989).

explicitly regulates "Reid Vapor Pressure for Gasoline".[34] The regulation imposes a 9.0 psi RVP for gasoline "sold or supplied" as motor fuel in the thirteen California Air Basins during the warmest months of the year. Starting and closing dates vary with the climate. The period subject to the 9.0 psi limit currently varies in length from four months in the "North Coast" and "Lake County" Air Basins to seven months in the "South Coast" and "Southeast Desert" Air Basins. Non-complying gasoline dispensed at retail outlets is exempt from sanction, if it was delivered to the gas station more than 14 days prior to the start of the coverage period.[35]

Although California's 9.0 psi summer RVP standard was a unique program for many years; compliance did not pose undue burdens for the petroleum marketing industry. California has a large refining capacity within its own borders. If a refinery lacked the capacity to produce, store and distribute multiple RVP grades of gasoline, it could still do a very good business providing the intrastate market with 9.0 psi

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[34]CAL. ADMIN. CODE tit. 13 § 2251. R. 70 (1989).

[35]The 9.0 psi RVP standard is applicable as follows:

(a) April 1--October 31: South Coast Air Basin, Southeast Desert Air Basin;
(b) May 1----October 31: San Francisco Bay Area Air Basin, San Diego Air Basin, Sacramento Valley Air Basin, San Joaquin Valley Air Basin, Mountain Counties Air Basin, Lake Tahoe Air Basin;
(c) May 1--September 30: Great Valley Air Basin;
(d) June 1---October 31: North Central Coast Air Basin, South Central Coast Air Basin;
(e) June 1-September 30: North Coast Air Basin, Lake County Air Basin.

California's "Air Basins" do not directly correspond to the subdivisions used by the ASTM.

gasoline. About 11% of America's summer demand for gasoline is generated within California.[36]

Even with most of its gasoline being refined in state, California's summer RVP regulation program gives a good example of the leadtime challenge posed by the spring shift from high RVP to the regulated level. Given the necessity to clear or blend down the stocks of high RVP gasoline in their own tanks and pipelines, and at least those of their midstream bulk plants and bulk terminals if they are to avoid penalties, California refiners start production of 9.0 RVP gasoline four or five weeks prior to the start of the summer enforcement period.[37]

C. State RVP Regulation Outside California

None of the other forty-nine states are qualified for the 42 U.S.C. § 7545(c)(4)(B) "California" exception from federal preemption of fuel content regulation. Within its existing language, no additional state could ever qualify for that exemption. The waiver is limited to states exempted from

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[36]American Petroleum Institute, Table: "Impact of Gasoline RVP Reductions on the U.S. Refining Industry" included with, J. Cabaniss, supra note 83.

[37]Massachusetts Department of Environmental Quality Engineering, Responses to Written and Oral Testimony Presented at Public Hearing on the Proposed Amendments to Regulation 310 CMR 7.00 and 7.02(12) for the Control of Air Pollution to Reduce Volatile Organic Compound (VOC) Emissions by Reducing Gasoline Reid Vapor Pressure 23 (March 1988). The March ASTM designations for California range from Class D to Class B.

federal vehicle emissions standards.[98] That exemption extends only to states whose separate vehicle emissions standards were already operative prior to March 30, 1966.[99] As previously discussed, California was the only such state. Because of that language, if in the future, a "Nonattainment" state adopts California's vehicle emissions standards as part of a State Implementation Plan revision,[100] that Nonattainment state will not be authorized to adopt California's fuel standards along with those California emission standards.

A review of the preemption language of 42 U.S.C. § 7545(c)(4)(A) explains how EPA could find a number of states with ongoing Reid Vapor Pressure regulation programs in 1987. Federal preemption is limited to state restrictions adopted or enforced "...for purposes of motor vehicle emission control."[101] As an exercise of their police powers, the states regulated RVP along with octane, labeling and other factors linked to consumer protection. Some states had regulated the general content of gasoline since the 1930's.

In 1987, twenty state legislatures and the District of Columbia had not authorized RVP regulation.[102] Apart from

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[98]42 U.S.C. § 7543(b) (1989).

[99]42 U.S.C. § 7545(c)(4)(B) (1989).

[100]42 U.S.C. § 7507 (1989).

[101]42 U.S.C. § 7545(c)(4)((A) (1989).

[102]Those "states" included eight which had no gasoline inspection law: Alaska, the District of Columbia, Kentucky, Nebraska, Ohio, Oregon, Washington and West Virginia.

California, legislatures in twenty-nine states had extended gasoline inspection authority to include Reid Vapor Pressure.[103] Close examination proved state efforts not to be as extensive as this statistic suggests. Similarly, except in California, compliance with state RVP regulations should not have been a particularly demanding chore for marketers of gasoline.

As of 1986, the breadth of coverage was reduced by factors peculiar to individual states. Colorado, Wyoming and Michigan were in the process of developing regulatory programs.[104] New Mexico's administrators had failed to used existing statutory authority to actually adopt a regulatory program. Idaho, Indiana, Rhode Island and South Carolina had regulatory programs on the books, but were not enforcing them. Mississippi had an active program with nine full time inspectors, but was planning to stop enforcement activity in

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Thirteen states had gasoline inspection laws, but no authorization for RVP regulation: Connecticut, Kansas, Maine, Massachusetts, Nevada, New Hampshire, New Jersey, New York, Oklahoma, Pennsylvania, Tennessee, Texas and Vermont. ESI INTERNATIONAL INC., SUMMARY OF STATE REGULATION OF REID VAPOR PRESSURE IN THE FORTY-NINE NON-CALIFORNIA STATES, Part IV, (revised, July 25, 1986)[hereinafter SUMMARY OF STATE REGULATIONS](available in U.S. EPA Docket A-85-21 as Document II-A-38).

[103] *id.* Parts III & IV; and R. Kenney, U.S. EPA, Memorandum to File, Subject: State Volatility Controls (May 11, 1987)(available in U.S. EPA Docket A-85-21 as Document II-A-39).

[104] Colorado's RVP program became effective 1 July 1986; Michigan's on 27 January 1987, though Michigan actually lacked any capability to test gasoline samples for RVP. Kenney, supra note 103.

July 1986.[105]

Enforcement Activities of State RVP Programs 1986

State	Inspections	Violations	Stop Orders
Alabama	50-100	1-2	1
Arizona	200	0	N/A
Arkansas	1070	0	N/A
Delaware	~5*	0	N/A
Florida	12,000	40-50	3-4
Georgia	~2,250	~10	0
Illinois	none*	0	N/A
Iowa	4000	1	1
Louisiana	180	0	N/A
Maryland	14,429	15-20	0
Minnesota	500	3-4	0
Mississippi (final year)	4,000	40-50	20
Missouri	898	21	?
Montana	none*	0	N/A
North Carolina	6,695	0	N/A
North Dakota	1,054	8	0
South Dakota	90	0	N/A
Utah	300	6	~1
Wisconsin	563	4	4

*Inspection after consumer complaint only

Figure 5

The Reid Vapor Pressure testing conducted by these states was only a part of a gasoline consumers' protection program. Unlike the ozone-reduction air quality oriented RVP standards eventually adopted by EPA, the state standards applied throughout the calendar year. The state programs were broadly focused and designed to insure retail customers received the octane and other gasoline performance attributes they were paying for. Some states, such as Alabama, Georgia and Minnesota tested vapor pressure in only 10 to 20 percent of

[105]SUMMARY OF STATE REGULATIONS, supra note 102, Part II.

the gasoline samples taken during their inspections.[106]

As mentioned previously, the state regulatory programs were not particularly onerous. As shown by Figure 5, state testing programs seem to have detected a paucity of RVP violators, even given the programs' generally small scale. Probably the single most important factor leading to the high compliance levels was the nearly uniform reliance by the states on ASTM standards. Many of the oil industry's standard supply and distribution contracts required compliance with the ASTM specifications. By copying ASTM standards in their regulations, these states in effect gained the advantage of a huge private, contractual enforcement mechanism.[107]

Five of the non-California states did make minor, non-burdensome deviations from the ASTM approach:

- Throughout the year, Alabama's maximum RVP limits (12 psi summer/14 psi winter), were set from 1/2 to 2 pounds per square inch higher than the industry standard.[108]
- Arizona had two slightly different regulatory schemes, "Area I" for the Prescott vicinity and areas under 4500 feet in altitude; and a different scheme for terrain above 4500 feet (Area II). "Area

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[106] *id.* at Part II.

[107] *id.* at pp. II-3 through II-6; and ASTM Schedule of Seasonal and Geographical Volatility Classes, at Appendix III.

[108] SUMMARY OF STATE REGULATIONS, supra note 102, at II-3.

I" followed the ASTM standard exactly. In Area II Arizona followed ASTM standards in the summer and winter. In spring and summer, the state authorized distribution of gasoline exceeding the ASTM standard by amounts of from 1 to 2 pounds per square inch. Since gasoline evaporates more easily with increases in altitude, the Arizona Area II scheme may have increased VOC emissions.[109]

- In its last year of regulation, Mississippi imposed no regulation in September and October. In the remaining months the state matched ASTM limits, except in August, which was the one month the ASTM scheme required Class B (10.0 psi) gasoline to be sold. Instead, Mississippi required only Class C (11.5 psi) gasoline in August, which was the same grade recommended by the ASTM and required by Mississippi from April through July.[110]
- Maryland's scheme differed from the norm. In most of the state, in some months, its regulation was actually slightly more restrictive than the ASTM plan. In the ASTM schedule, March and November were "transition" months in which either Class E (15

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[109] *id.* at pp. II-3 through II-6; and ASTM Schedule of Seasonal and Geographical Volatility Classes, at Appendix III.

[110] SUMMARY OF STATE REGULATIONS, supra note 102, at pp. II-5, III-116.

psi), or Class D (13.5) psi gasoline could be sold. Similarly in May, the ASTM provided a transition from Spring, Class D (13.5 psi) gasoline, to Summer, Class C (11.5 psi) gasoline. Maryland's standards were set midway between the ASTM classes in those months, and were thus more stringent than the oil industry's voluntary standard. But in April, and in June through October, the state RVP limits were higher than the ASTM limits.[111] Since the "ozone season" stretches from May to September, this emphasizes Maryland's vehicle performance orientation, despite its setting of "more stringent" limits.

- Indiana also set standards which both raised and lowered the ASTM recommended limits. But, again, the state's Summer limits on Reid Vapor Pressure, those most relevant to ozone control, were actually higher than the industry limits.[112]

These variances from the ASTM approach actually emphasize the prevailing concern in all the states was insuring consumer satisfaction with vehicle performance and not with limiting VOC emissions.

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[111] In addition, the three western counties had regulatory limits exceeding the ASTM recommendations in eight months of the year: January, February, June, July, August, September, October, and December. *id.* at pp. II-4, III-94.

[112] *id.* at pp. II-4, III-73.

D. Preemption Litigation Prior to 1988

State Reid Vapor Pressure regulations were not onerous, and rarely generated litigation. Nonetheless, passage of the Clean Air Act in 1970 may have altered the legal status of state (and local) regulations.

In 1972, New York City cab companies challenged the enforcement of a city ordinance requiring licensed cabs to use low-lead gasoline and pre-1970 model cabs to be retrofitted to enable them to use low-lead gasoline. The trial judge held the local ordinance served the underlying purpose of the Clean Air Act, (i.e. cleaner air), and therefore the federal act's preemption provisions should be narrowly construed. The judge then denied the plaintiffs' claim of federal preemption, because they made no showing:

- The EPA administrator had promulgated a federal rule;
- Or, the EPA Administrator had made a finding that no such rule was necessary.

The judge held, at least given the purely intrastate impact of the city's hack licensing scheme, the absence of federal action left the door open for local action.[113]

Even after EPA did adopt lead limits for gasoline, a 1973 decision by the same court allowed New York City to continue enforcing its maximum lead content regulation. The District

[113]Allway Taxi, Inc. v. City of New York, 340 F. Supp. 1120 (S.D. N.Y. 1972), aff'd per curiam 468 F.2d 624 (2d Cir. 1972).

Court reasoned EPA control of fuel and fuel additive served two distinct, severable functions: protection of public health and protection of emissions devices. The court ruled the EPA lead regulations were designed solely to protect catalytic converter emission devices; leaving health protection a field open to more stringent local regulation.[114]

This decision was reversed in 1977. In *Exxon Corp. v. City of New York*,[115] the Second Circuit did not directly address the lower court's reasoning; but in the interim, since the District Court decision, EPA had promulgated health based lead-content regulations. Most significantly, the appellate court not only overturned the city's lead restrictions, it also overturned § 1403.2-13.12 of the New York City Administrative Code, which set seasonal Reid Vapor Pressure limits for gasoline.[116] The appellate court noted the RVP section of the ordinance was not identical to the federal regulation, and was not promulgated as part of a State Implementation Plan. Therefore it did not fit under any CAA

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[114] Exxon Corp. v. City of New York, 356 F. Supp. 660, 663 (S.D. N.Y. 1973).

[115] 548 F.2d 1088 (1977).

[116] The ordinance provided:

> "Volatility limits on gasoline.--Effective October 1, 1971, no person shall cause or permit the use, or, if intended for use in the city of New York, the purchase, sale, offer for sale, storage or transportation of gasoline which exceeds the following volatility limits:
>
> (a) For the period October 1, through April 30, not to exceed 12 Reid vapor pressure.
>
> (b) For the period May 1 through September 30, not to exceed 7 Reid vapor pressure."

Exxon Corp. v. City of New York, 548 F.2d 1088, 1095 n.13 (1977).

§ 211(c)(4) exception.[117] The Second Circuit relied upon the record of the Conference Committee:

> No State may prescribe or enforce controls or prohibitions respecting any fuel or additive unless they are identical to those prescribed by the Federal Government or unless a State implementation plan under sec. 110 includes provision for fuel or additive control and such plan is approved as being necessary for achievement of national air quality standards.[118]

The Second Circuit found preemption even though no federal RVP regulation existed. Rulemaking for a federal Reid Vapor Pressure standard would not even begin until 1987.

VII. Federal Regulation

A. The Beginnings of Federal Regulation

The federal government took almost twenty years to address gasoline volatility's contribution to air pollution. Even today there is no one, single federal standard; the federal standards do not apply throughout the calendar year; and although it is extensive, federal regulation is not truly national in scope.

Section 211 of the Clean Air Act[119] grants authority to

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[117]Exxon Corp. v. City of New York, 548 F. 2d 1088, 1096, (1977).

[118]Exxon Corp. v. City of New York, 548 F.2d 1088, 1094 (1977)[quoting CONF. REP. No. 1783, 91st Cong., 2d Sess., *reprinted in* 3 U.S. CODE CONG. & ADMIN. NEWS 5356, 5374, 5385 (1970)].

[119]42 U.S.C. § 7545 (1989).

the Administrator of EPA to regulate fuel and fuel additives. The Administrator may control fuels and their additives which create air pollution threatening public health, or which impair the performance of emission control devices.[120] From the time it was enacted, a primary focus in the enforcement of this section was the deleading of gasoline.[121] Little attention was paid to regulating the other chemical properties of gasoline.

In most urban areas, one-half or more of the VOC emissions inventory is tied to automobile use and gasoline.[122] Among these emissions are evaporative losses. Two types of evaporative emissions have long been identified with motor vehicles:

- After vehicle operation and engine shut off, the residual heat in the engine block will continue to heat and vaporize fuel left in the engine, the carburetor or fuel injection system, and even the gas tank. This phenomenon is called the "hot soak."
- On a hot day, a car which has not been operated, will still generate vapors as the car and its gas tank are warmed by the sun and the outside air.

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[120] 42 U.S.C. § 7545(c)(1) (1989).

[121] See Ethyl Corp. v. EPA, 541 F.2d 1 (D.C. Cir. 1976) [interpreting the Clean Air Act's pre-1977 Amendment language].

[122] M. Woolcott, supra note 13, at 1.

This phenomenon is called a "diurnal emission".

In United States specification automobiles, while the engine is shut-off, the diurnal emissions and those from hot soaks are routed to a canister where they are absorbed by charcoal granules. This canister's charcoal (and vapor) storage capacity is limited, so each time a vehicle is started, air is drawn through the canister to purge it of the stored vapors. The purged vapors are routed to the engine and burned-off.[123]

The Environmental Protection Agency first developed an evaporative emission standard for gasoline fueled passenger cars and "light-duty" trucks in 1971.[124] This standard of 2 grams-per-test focused entirely on evaporative hydrocarbon leakage from the charcoal canisters. In 1978, a 6 grams-per-test standard was created, but the focus of the test was expanded to include evaporative emissions from the entire vehicle. In 1981, while keeping the emissions focus on the entire vehicle, EPA reduced the standard back to 2 grams-per-test. In 1985, two "heavy-duty" vehicle standards were developed for gasoline powered trucks and buses.[125] The goal of these evaporative controls was to attain an emissions

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[123]Proposed Rulemaking, supra note 10, at 31,279.

[124]At that time a "light-duty" truck was defined as having a Gross Vehicle Weight [GVW] under 6000 pounds.

[125]The two standards were 3 grams/test for trucks under 14,000 pounds GVW; and 4 grams/test for trucks over 14,000 pounds GVW.

reduction of about 95% from uncontrolled vehicles.[126]

The steady increases in fuel volatility since 1970 eventually compromised the validity of this approach. The test fuel used to measure compliance with these standards had a Reid Vapor Pressure of 9.0 psi. After 1970 the average RVP of fuel actually in-use steadily climbed above that level.[127] A charcoal canister can only store a limited amount of gasoline vapor. Since automotive manufacturers designed their canister systems to meet only the requirements of the official test, the higher RVP levels (and the greater evaporation) of gasoline actually purchased at the pump routinely overloaded the canisters. Once saturation was reached, all additional vapors simply passed through the canisters and were vented into the air.

The high volatility of in-use gasolines thwarted the EPA's rosy projections of VOC emission reductions obtainable from the use of canisters. The agency conducted tests using 11.4--12.0 psi RVP gasoline, and found vehicle emission levels

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[126]R. Wilson, Office of Mobile Sources, U.S. EPA, Memorandum. Subject: VOC Running Losses from Motor Vehicles (September 8, 1988)(available in U.S. EPA Docket A-85-21 as Document IV-B-4).

[127]The National Institute of Petroleum calculated increases in summer RVP as follows:

1960	8.7 psi
1965	9.0
1970	9.0
1975	9.6
1980	9.8
1986	10.2

Fasullo, *RVP Reductions Would Harm U.S. Gas-Processing Industry*, OIL & GAS J., February 1, 1988, at 51, 52 (Table 2).

averaging 5 to 7 times the 2 grams-per-test standard. In 1987 EPA estimated about 80% of gasoline-related VOC emissions were evaporative emissions from the automobile.[128] The agency estimated the charcoal canister technology could capture sufficient high volatile fuel (11.5 psi) vapors to meet the 95% emission reduction goal if they were enlarged by a factor of 60%.[129]

In the mid-1980's high vapor pressure in gasoline was linked to a newly identified, third type of evaporative emission, "running losses". Running losses are VOC emissions which occur while a vehicle is operating, at points other than its crankcase and tailpipe.

As an automobile's engine operates and the vehicle moves, air is heated as it flows around the hot engine block and then passes under the car. The moving bearings and gears in the rear axle also generate heat, as does the exhaust system including the catalytic converter. Additionally, in the growing portion of the fleet whose engines are fuel injected, excess fuel may be returned to the gas tank after passing through and being warmed by the heated engine.[130] These heat

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[128]High volatilities also increased other gasoline related VOC emissions including exhaust emissions, refueling losses, storage and distribution losses. Proposed Rulemaking, supra note 10, at 31,279-82.

[129]Id. at 31,283.

[130]R. Wilson, supra note 126, at 2. Despite this contribution to the running loss problem, the net effect on evaporative loss emissions of the general switch to fuel injection has been beneficial. An average fuel injected car

sources tend to raise the temperature inside the gas tank of an operating vehicle 15-20°F above the ambient air temperature.

United States specification automobiles have been designed to extract these excess vapors collecting in the gas tank and run them through a purge line to the engine, where they are burned-off. Again, the high evaporative quality of the gasoline actually in-use, outstripped the design/test capacity of the automobiles. With high RVP gasoline, operation of a car generates so much vapor the capacity of the purge line is quickly exceeded. The vapors which cannot exit through the purge line are then absorbed by the carbon canister, but that is quickly saturated. Once the carbon granules are saturated, a continuing flow of excess vapor simply passes through the canister and is released into the exhaust.[131]

An additional source of running loss emissions can be the gas cap. As a safety measure, caps are designed to vent vapors when gas tank pressures reach from .5 to 2.0 psi above atmospheric pressure. A flow restrictor in the vapor hose to

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may suffer as much as 58% less evaporative HC loss than the average carbureted vehicle. Testimony of Arthur C. Crowley, Manager, Quality Administration, Atlantic Refining and Marketing Corp. before the New York State Department of Environmental Conservation on Proposed Air Pollution Control Regulation 6 NYCRR Subpart 225-3 "Fuel Composition and Use--Motor Fuel" 17 (August 2, 1988).

[131]R. Wilson, supra note 126, at 3.

the engine can cause vapor to build up in the tank. As pressure increases, excess vapors will be released through the filler cap directly into the air.[132]

Average running losses can vary widely between vehicles. Even for the same vehicle, they vary widely with changes in temperature, weather conditions, trip length, and fuel volatility. One EPA test calculated VOC running losses over a sixty minute trip with 11.5 psi gasoline and at 95°F. temperature. Running losses of VOC's averaged 9 grams/mile.[133] Other "average" running losses calculated by EPA at less extreme temperatures than 95° ranged between 2.44 and 5.74 grams/mile.[134]

EPA has estimated RVP reductions could reduce running losses by a factor of 80-85%.[135] The New Jersey Department of Environmental Quality calculated, that during a long trip, on a 95° F. day, using a 9.0 psi RVP gasoline instead of an 11.5 psi gasoline could reduce total vehicle VOC emissions by about 63%.[136]

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[132] id.

[133] id. at 1-4.

[134] D. Clay, Office of Air and Radiation, U.S. EPA, Memorandum. Subject: The Effect of Vehicle Running Losses on Future Ozone Non-Attainment (October 6, 1988)(available in U.S. EPA Docket A-85-21 as Document IV-B-8).

[135] R. Wilson, supra note 126, at 4.

[136] Proposed Rule, Approval and Promulgation of Implementation Plans; Revision to the State of New Jersey Implementation Plan for Ozone, 54 Fed. Reg. 12,654, 12,655

B. The Attraction of RVP Regulation

Onboard canisters and other vehicle controls could be redesigned to achieve desired reductions (to EPA's 2-gram test standard) quite easily. During EPA's rulemaking, the American Petroleum Institute suggested EPA simply redesign its protocol for canister certification to require the use of ASTM Class C, 11.5 psi gasoline (the most widely used summer grade of gasoline) and cap further RVP increases by adopting the existing ASTM RVP levels as the federal standard. API forecast those two steps alone would produce a 72% reduction in evaporative losses.[137] Unfortunately for API and the oil industry it represents, regulators have preferred fuel volatility reductions over automotive controls.

Emission reductions through automotive controls can only be realized in an incremental manner, as the current fleet is replaced with new vehicles carrying the new technology. On average, it is expected to take between 13 and 15 years for 90% of today's fleet to be replaced with new vehicles.[138] Expected emissions reductions can be delayed as economic recession or consumer resistance to the new technology delays

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(March 28, 1989)[hereinafter Proposed Rule: New Jersey].

[137]Testimony of Joe T. McMillan, supra note 31, at 11.

[138]EPA estimates 15 years, API only 13. FRIA: PHASE II REGULATIONS, supra note 7, at p. 3-21.

turnover in the fleet.[139] Even after a new technology's presence in the fleet becomes widespread, its effectiveness can be compromised by overt tampering and by simple wear and tear.

In contrast, reducing fuel volatility achieves most of its VOC reductions immediately, and is not at all dependent upon the rate new vehicles are added to the fleet. Emission reductions are not dependent upon the operator's maintenance (or sabotage) of his vehicle. Lowering Reid Vapor Pressure should also reduce nonvehicle-related gasoline evaporative losses during storage and transfer operations in its distribution prior to reaching the consumer's gas tank. EPA also believes reducing excess vapors within the vehicle may have a "small but statistically significant effect," in reducing exhaust emissions of both hydrocarbons and carbon monoxide.[140] This Figure portrays emissions savings in late model (1981+) automobiles obtained through use of low volatility fuel.[141]

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[139]In Southern California, 15% (1,600,000) of the vehicles on the road are pre-1975 cars and pre-1980 trucks. These vehicles use leaded gasolines and travel only about 10% of the Vehicle Miles Traveled; but produce about 30% of Southern California's vehicular related pollution. L. COHU, L. RAPP & J. SEGAL, FINAL REPORT: EC-1 EMISSION CONTROL GASOLINE 2-3 (September 1989)(available from ARCO Products Co., Anaheim Cal.).

[140]Proposed Rulemaking, supra note 10, at 31,280.

[141]Corbett, Tough Air-quality Goals Spur Quest for Transportation Fuel Changes, OIL & GAS J. June 18, 1990 at 33, 34 (source, Sierra Research Inc.).

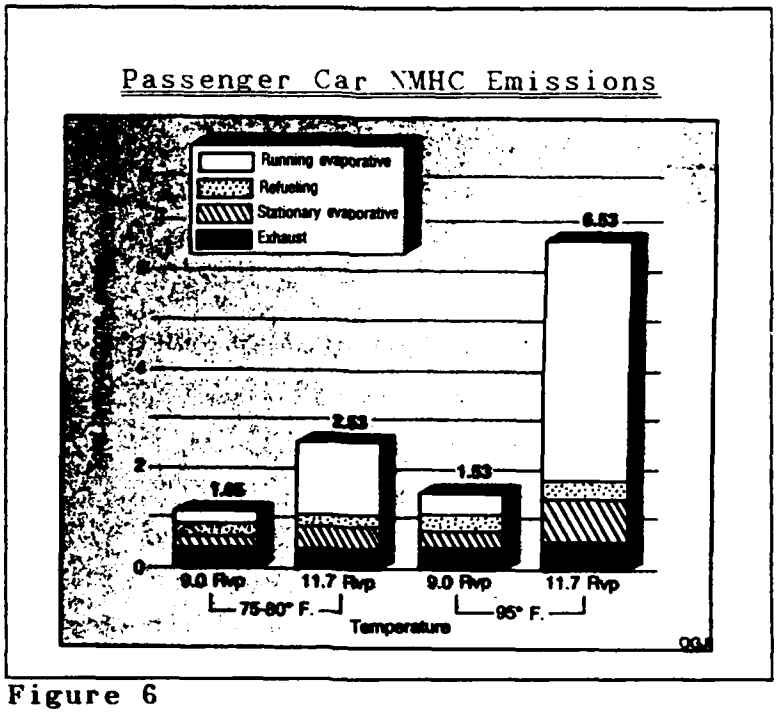

Figure 6

C. EPA's Phase I Volatility Proposal of 1987

In the summer of 1987, EPA finally used its CAA § 211 authority to propose gasoline volatility restrictions. Simultaneously, the agency proposed a tougher certification test for the charcoal canisters.[142] In addition, "onboard" refueling controls were proposed on the same day.[143] EPA

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[142]Proposed Rulemaking, *supra* note 10.

[143]After prolonged debate between automobile manufacturers advocating installation of Stage II controls at gasoline stations, and gasoline companies advocating installation of refueling canisters, EPA chose to require canisters. Installing Stage II controls on gasoline pumps could cost a large service station $15,000. Cost estimates per vehicle for the canister program ranged from: $12-$25 (Oil industry); $30-+$100 (Auto industry) to $19 (EPA). Despite the time required for fleet turnover, EPA had concluded On-board controls would ultimately (by the year 2000) be more effective in reducing VOC emissions than Stage II controls, which are mechanically more complicated and have much higher maintenance costs. Notice of Proposed Rulemaking, *Control of Air Pollution from*

projected significant emissions savings by reducing RVP. EPA estimated a reduction to a 9.0 psi level in the ASTM Class C areas alone could reduce gasoline related VOC emissions by 28%.[144] Significantly, the Phase I and Phase II RVP reductions were expected to reduce total VOC emissions by 8%; compared to only a 2% reduction for refueling controls.[145]

In its volatility proposal, EPA modified the approach used by the American Society for Testing and Materials. EPA also proposed regional standards roughly paralleling ASTM's Class A-E designations and reflecting the impact of local climate and altitude.

A draft of the regulation was submitted to the Office of Management and Budget [OMB], March 17, 1987. In the draft, EPA simply substituted a standard of 9.0 pounds per square inch in any state and <u>any</u> month which was designated by ASTM to receive Class A, B or C gasoline.[146] (The suggested Reid

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New Motor Vehicles and New Motor Vehicle Engines: Refueling Emission Regulations for Gasoline-Fueled Light-Duty Vehicles and Trucks and Heavy-Duty Vehicles, 52 Fed. Reg. 31,162 (August 19, 1987).

[144]Class C area non-methane hydrocarbon [NMHC] reductions would amount to 2,074,000 tons at the emission rate then projected for 1988. Proposed Rulemaking, supra note 10, at 31,280.

[145]*Proposed Automotive Refueling Controls, Gasoline Volatility Limits Published by EPA*, 18 Env't. Rep. (BNA) No. 17, at 1105 (August 21, 1987).

[146]*EPA Sends Vapor Recovery Proposal to OMB, Includes Onboard, Fuel Volatility Controls*, 17 Env't. Rep. (BNA) No. 48, at 1995 (March 27, 1987).

Vapor Pressure of 9.0 pounds per square inch matched ASTM's standard for its least volatile, "Class A" gasoline). Under this proposal, federal regulation would have required 9.0 psi gasoline to be sold in Maine from about May to September, and in every month but January in Arizona.[147]

When the proposal was promulgated in the Federal Register, EPA abandoned this "one size fits all" approach. Three separate RVP levels were proposed, each corresponding to a reduced RVP version of ASTM's Class A, B and C gasolines. In addition, EPA's proposed standards were to begin in 1989, and to operate only from 16 May through 15 September.[148] This focused the federal regulatory effort during the summer months in which 96% of all ozone nonattainment violations occur.[149] The scope of the proposal was further narrowed by the exclusion of Hawaii and Alaska from the proposed regulation "...because neither of these states has an ozone problem and both have independent gasoline supply networks...[and] fuel consumption and vehicle-miles-traveled (VMT) in these states are very small compared to nationwide totals (about one-half of one percent)."[150]

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[147]See the ASTM Schedule of Seasonal and Geographic Volatility Classes at Appendix III.

[148]EPA's Summer 1989 RVP Standards, as proposed in 1987, are found at Appendix IV.

[149]Proposed Rulemaking, supra note 10. at 31,275.

[150]Id. at 31,305 n.20.

EPA also proposed a second set of even more restrictive volatility standards, to commence in the summer of 1991.[151] EPA cut each ASTM standard by about 9% in its 1989 proposal, and by 22% in the 1991 proposal.

		Proposed[152]	
ASTM Class	ASTM/1970	EPA/1989	EPA/1991+
A	9.0	8.2	7.0
B	10.0	9.1	7.8
C	11.5	10.5	9.0
D	13.5	12.3	10.6
E	15.0	13.7	11.7

Figure 7

In its self-regulation of Reid Vapor Pressure levels, the petroleum industry used, what might be called, "transition" months. For each state, as gasoline classifications rise or fall one level, both the old and the new ASTM classification were authorized in one intervening month. Government regulation requires one, enforceable standard for any given month. A comparison of the ASTM and EPA approach to Alabama is illustrative. The ASTM required Alabama gasoline to be at least Class C in June, and at least Class B in August. In July, Alabama gasoline could meet

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[151]The RVP standards EPA initially proposed for 1991 are found at Appendix V.

[152]In examining Appendices IV and V, note EPA used only the three lowest RVP gasolines (A,B and C) during the summer enforcement period. Proposed Rulemaking, supra note 10, at 31,305.

either standard.[153] On the other hand, under both the EPA's proposed and final regulations, the July standard is simply Class B.[154]

As discussed in Part III, Section B[1] *infra*, the greater the variance between the RVP of the winter and summer grades of gasoline, the more times low RVP gasoline will have to be added and withdrawn from storage tanks to insure the top layers of high RVP fuel get blended down to legal standards. Under the ASTM system, a tank could be brought into compliance after 1 or 2 such "turns". Oil companies expected the deeper cuts to the lower grades required by the proposed regulation would take 2 to 3 "turns" per tank for the proposed 1989 standard, and as many as 3 or 4 "turns" per tank in the second phase of regulation.[155]

Another significant "transition" issue was EPA's plan to extend enforcement to include retailers.[156] As enforcement is extended "downstream", the leadtime necessary for the

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[153]See the ASTM "Schedule of Seasonal and Geographic Volatility Classes" at Appendix III.

[154]Respectively Appendices IV and VI.

[155]Each "turn" would add processing time. API estimated that under the proposed Phase II standards, it would take 30-35 days to reach a 50% "on-specification" rate for gasoline drawn from a storage tank; and 60-65 days to reach a 95% "on-specification rate." During Phase II, a refiner would have to be producing low RVP gasoline for at least sixty days before he could have any assurance the product shipped from his storage tanks complied with summer standards. Transportation and Storage Times of Motor Gasoline *supra* note 30, at 4-5.

[156]Proposed Rulemaking, *supra* note 10, at 31,296-97.

"upstream" refiners to get the low RVP gasoline produced and distributed to them is increased. EPA's study estimated on average, gasoline spent 25 days in transport and storage as it moved from the refinery to the consumer's gas tank.[157] Refiners thought EPA generally underestimated average transport times by about 30 days. In any event, faced with retail level enforcement, refiners and importers have to schedule their production and shipments to insure all, and not just their "average" retailers can comply with regulatory requirements. EPA's plan to subject retailers to compliance on May 16 along with the other participants in the market was expected to force refiners to add 30 additional days production of low RVP gasoline production leadtime into their refining schedule.[158]

D. The Phase I Program is Adopted

EPA published its Notice of Final Rulemaking for Phase I in March 1989.[159] The Secretary of Transportation and National Highway Traffic Safety Administration experts had expressed concern about the safety of EPA's proposed vehicular modifications. so for the time being at least. modifications

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[157]EPA estimated 50% of an average refiner's gasoline reached consumers within 20-30 days: 88% within 10-40 days. At least 1% of the gasoline was expected to take 55+ days to reach the consumer. Jack Faucett Associates, supra note 27, at 15.

[158]Testimony of Joe T. McMillan, supra note 31, at 13.

[159]Final Rulemaking-Phase I, supra note 56.

to the charcoal canisters and other "onboard" controls were put on hold.[160]

Alaska and Hawaii continued to be excluded from regulation. The "summer-only" coverage scheme was maintained, though as adopted, RVP regulation was extended two weeks by beginning coverage May 1, instead of May 15. September 15 was kept as the last day of enforcement. The RVP levels designated by EPA varied extensively from those the agency had proposed in August of 1987. EPA claimed it had "fine tuned" its proposal of eighteen months earlier by redesignating many states or regions within states to a tougher ASTM class for at least the hottest part of each summer.[161] In many states (e.g. Alabama and Arizona), the maximum allowable RVP does undergo two separate modifications between 1 May and 15 September; but study of the 1987 draft proposal shows that in fact, EPA had already proposed such monthly adjustments for nineteen different states and parts of states.

EPA's "fine tuning" was largely both a rationalization and a relaxation of its proposed standards:

- EPA cut the number of variants in its "national" regulatory scheme from nine in the proposed

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[160]*Federal Fuel Volatility Regulations for Controlling Ozone Formation Issued by EPA*, 19 Env't. Rep.(BNA) No. 46, at 2460 (March 17, 1989); and Chappie, Davis, Johnson, Minis, & Stimson, *EPA Faces Rule-Making Challenges in 1989*, 19 Env't. Rep. (BNA) No. 39, at 1917, 1918 (January 27, 1989).

[161]Final Rulemaking-Phase I, supra note 56, at 11,869.

regulation to six in the final regulation.[162]

- EPA "reclassified" and regulated a number of states less stringently in the final version of its regulation. For example, in the final regulation, nine attainment states or parts of states[163] were added to the twenty-four for which the draft had authorized the most lenient standard (10.5 psi) throughout the summer. Although more stringent standards remained applicable for part of the summer, the Southeastern states and several others were authorized an additional month at 10.5 psi.
- In addition, the maximum RVP's of 8.2 psi and 9.1 psi initially proposed for Class A and Class B areas were adjusted upward to 9.0 psi and 9.5 psi, respectively. EPA accepted industry arguments the lower levels proposed in the draft could not be met without capital investment and construction at most refineries. Construction requires leadtime. Rather than delay implementing standards altogether, EPA relaxed the Phase I limits.[164]

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[162]Among other consolidations, the draft's unique regulatory schemes for Iowa, Southern Illinois and Southern New Mexico were eliminated in the final proposal.

[163]North Dakota, South Dakota, Iowa, Nebraska, Montana, Wyoming, Idaho and eastern Oregon and eastern Washington.

[164]The industry's lobby, the American Petroleum Institute, suggested these levels during the comment period. Testimony of Joe T. McMillan, supra note 31, at 12; and see Final Rulemaking-Phase I, supra note 56, at 11,879.

EPA forecast the Phase I controls would secure a 3% (674,000 ton) reduction in the annual total of VOC emissions (from all sources).[165]

Shortly after publication of the Final Rule, EPA promulgated some minor corrections to its definitions and sampling provisions.[166] A more substantive correction was published a few weeks later. A Southwestern refiner, Giant Industries Inc. had complained EPA had not followed its "fine-tuning" policy in northern New Mexico. ASTM had authorized both Class A and Class B gasoline to be sold there in the month of August. Northern New Mexico contained no ozone nonattainment AQCR's, yet EPA's plan had restricted the area to Class A (9.0 psi) gasoline in August. Giant complained this treatment was inconsistent with the EPA treatment of transition months in all other areas which were in attainment. Giant specifically complained the investment and extra costs needed to make and segregate August Class A gasoline for northern New Mexico would place the company at a competitive disadvantage with rival companies in its other markets. EPA agreed, and revised its August, northern New Mexico standard to Class B (9.5 psi).[167]

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[165]Final Rulemaking-Phase I, *supra* note 56, at 11,880.

[166]Final Rule; Correction: *Volatility Regulations for Gasoline and Alcohol Blends Sold in Calendar Years 1989 and Beyond; Correction*, 54 Fed. Reg. 27,018 (June 27, 1989).

[167]Notice of Final Rulemaking, *Volatility Regulations for Gasoline and Alcohol Blends Sold in Calendar Years 1989 and Beyond*, 54 Fed. Reg. 33,218 (August 14, 1989).

EPA expected the 9.0 psi level to be met by the refineries: reducing the amount of butane they added to their gasoline; and if necessary, they could adjust their fractioning and polymerization processes to increase the production of the somewhat less volatile gasoline components needed to replace fuel volume and octane lost with the missing butane.[168]

Even though no capital investment was expected to be required; since butane is cheaper than gasoline, compliance with the Phase I volatility controls was expected to cost the refiners $247 million per year. This additional cost would average about .54 cents per gallon of gasoline sold during the May-September time period.[169] Many companies were expected to be in a competitive position where these costs could ultimately be passed to the consumer. Drivers were expected to attain fuel economy savings of about .23 cents per gallon. These savings would be obtained through reduced evaporative losses and through more efficient energy generation from the denser fuel.[170]

Gasoline refiners had been their own source of supply for 80% of the butane they had been using in their gasoline. Phase I would allow many of them to keep some butane in their

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[168]Final Rulemaking-Phase I, supra note 56, at 11,869.

[169]American Petroleum Institute's cost estimates were about double those of EPA. id. at 11,880-81.

[170]The net value of the fuel savings were expected to be $104 million per year. id. at 11,880.

summer gasoline. The reduced demand for butane the Phase I regulation created was expected to hit outside suppliers in the natural gas liquids [NGL] industry the hardest. Butane sales constituted from 1% to up to 40% of revenues for various NGL producers. The reduced demand due to Phase I's lowered RVP levels was expected to cut the market price of butane by 11%.[171]

For the most part, natural gas processors do not have the option of simply leaving butane as a component in the natural gas stream. The butane is normally removed as a byproduct of the processes used to extract high value ethane and propane from the natural gas. Furthermore, the butane must be removed to meet "dew-point" specifications in most natural gas transmission pipelines. On-site storage of butane for sale as winter grade blend stock is limited by space and market risk factors.[172]

When Phase II regulations take effect, the natural gas producers may find their prices depressed even further, as oil companies may unload butane in the marketplace or use their butane as "feedstock" for alkylation processes. This would not only depress the NGL industry's butane market, it

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[171] *id.* at 11881-82.

[172] It may not be sound business practice to build and maintain expensive seasonal storage facilities for a low value product while facing competition from 300 other domestic natural gas processors, including the oil refineries themselves. Fasullo, *supra* note 127, at 54 (and Table 8).

could also depress their prices for propane and ethane, which are currently sold to the oil industry for that purpose.[173] Industry sources project Phase II controls may lead to the shutdown of 312 natural gas processing plants representing 10,000 jobs and 7% of United States production.[174]

The Environmental Protection Agency thought this lost market might be partially replaced by growing demand for butane as a component for polymerization into lower volatility gasoline components, or as "feedstock" in the manufacture of methyl-tertiary-butyl ether [MTBE]. (MTBE is an alternative to alcohol as a fuel oxygenating and octane enhancing component).[175]

Another potential "cost" of removing butane to reduce RVP is increased cancer risk. Removing butane reduces not only a gasoline's Reid Vapor Pressure; it lowers octane as well. With the forced elimination of lead and reduction of butane, adding aromatics is one of the few methods available to replace lost octane. Increasing the percentage of aromatics should increase the emission of carcinogenic

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[173]FRIA: PHASE II REGULATIONS, supra note 7, at pp. 4-27 and 4-28.

[174]Fasullo, supra note 127, at 55.

[175]Final Rulemaking-Phase I, supra note 56, at 11,881-82. Although EPA forecasts may be fair for the industry as a whole, the burden of regulation can fall unevenly. Many processors, especially among the 366 natural gas plants (out of national total of 901) located away from the Gulf coast may not have access to petrochemical companies capable of utilizing their butane.

benzene. EPA had conceded the benzene and aromatic fraction of exhaust and evaporative emissions would increase, but the "substantial reductions in total evaporative and exhaust emissions would offset this effect."[176]

Removal of butane "filler" from gasoline also has geopolitical ramifications. In each gallon of commercial gasoline sold, the butane which has been removed is replaced with additional gasoline compounds. Domestic production does not currently supply America's needs, and is falling as a percentage of our total consumption. The additional demand for gasoline caused by lowering Reid Vapor Pressures can only be met through imports. Just as with consumer costs, the reduced evaporative losses and potentially greater energy efficiency of lower RVP fuels may partially counteract this effect; but, overall, reducing gasoline RVP adversely impacts the United States' Balance of Payments[177] and its strategic defense.

E. EPA's Alcohol Problem

EPA's Phase I regulation granted marketers of "gasohol" a RVP limit 1 psi higher than that set for straight gasoline. This allowance was a concession to the economics of the gasohol market.

Gasohol is made by blending gasoline with ethanol. The

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[176]Proposed Rulemaking, supra note 10, at 31,282.

[177]Final Rulemaking-Phase I, supra note 56, at 11,880.

ethanol is distilled from corn and other vegetable products. Prior to promulgation of the Phase I regulations, its RVP had effectively been unregulated by the federal government.[178] Compared to petroleum refining and marketing, most gasohol "production" and marketing is a low technology, decentralized operation. In common practice, the wholesalers of gasohol obtain stocks of ethanol which they store on their property. They then purchase commercial grade gasoline, only partially filling their tank trucks with the gasoline they have purchased. They then bring the partially loaded trucks to their plants, and simply add ethanol. Having "splash blended" the gasoline and ethanol into a "gasohol" mix, the wholesalers promptly dispatch their trucks to the retailers they serve.[179]

Ethanol is more volatile than gasoline. For every 10% ethanol added to a gasoline base, the Reid Vapor Pressure of the resulting blend is raised 1 psi.

The gasoline refiners could be expected to refine and market their gasoline at its maximum RVP limits. This probability left the ethanol blenders with two concerns:

- Requiring the blenders to meet the same RVP standard

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[178]The ethanol blending industry submitted a request for 42 U.S.C. § 7545(f) approval of ethanol as a fuel additive in 1978. The waiver request did not include any limits upon Reid Vapor Pressure. EPA did not disapprove the request in the required 180 days, so the waiver was automatically granted under 42 U.S.C. § 7545(f)(4) (1989).

[179]About 95% of ethanol blending is done in tank trucks at ethanol terminals. Final Rulemaking-Phase I, supra note 56, at 11,873.

as the gasoline refiners would force them to specially order low volatility gasoline. Only about 8% of the gasoline sold in the United States is sold mixed in ethanol blends.[180] Apart from the generally higher cost of gasoline as its RVP is reduced, special orders for a market this small would be more expensive than purchasing commercially marketed gasoline.

- The cost of testing to insure compliance with standards could be prohibitive. There is no "field test" available to measure RVP, a lab analysis is required. The economic cost of testing each truckload of a few thousand gallons and then waiting for lab results could not be borne by the ethanol blenders. (In comparison, one test may be used to measure the RVP of hundreds of thousands of gallons of gasoline in the storage tank of a refinery or bulk terminal).[181]

EPA allowed the ethanol blenders to continue to use any commercial grade gasoline meeting the locally applicable RVP standard as their base. The finished product could exceed the gasoline standard by 1 psi, provided the blend was at least 9% ethanol by volume and labeling requirements were

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[180]TRIA: PHASE II REGULATIONS, supra note 7, at p. 3-46.

[181]Final Rulemaking-Phase I, supra note 38, at 11,873-74.

met.[162]

Given the liability scheme discussed in the next section, all participants in the gasoline market should want to keep records, but ethanol blenders are the only participants in the gasoline market EPA requires to keep records. Pumps dispensing ethanol blends must be labeled to that effect. Every invoice, loading ticket, bill of lading etc. which accompanies a shipment of gasohol must clearly identify its ethanol content. Each blender, distributor, reseller, carrier, wholesale purchaser-consumer, and retailer must retain copies of such documents for a year. Failure to keep and produce these records as required, or failure to produce them upon the request of EPA's representatives, deprives the individual concerned of the +1 psi allowance otherwise authorized for ethanol blends.[163] The +1 psi cap prevents refiners, bulk terminals and plants from using the gasohol blenders as a summer "dumping ground" for high RVP fuel.

Although their product raises volatility in a similar fashion to ethanol, methanol blenders did not receive the +1 psi allowance. The factors supporting the ethanol exception were not felt to apply to methanol. Methanol is obtained from natural gas and coal. Its production and marketing is more technological and more centralized than ethanol marketing. Prior to promulgation of the Phase I

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[162]40 C.F.R. § 80.27(d) (1989).

[163]40 C.F.R. § 80.27(d)(3) (1989).

regulation, methanol blends (in unleaded gasolines) were already being regulated under § 211 of the Clean Air Act.[184] Under Phase I, methanol marketers must meet precisely the same RVP limits as the gasoline refiners.[185] In effect this forces them to arrange for the refining and purchase of low volatility "base stock".

F. Enforcement

EPA's volatility regulations penalize refiners, importers, distributors, resellers, carriers, ethanol blenders, retailers and wholesale purchaser-consumers; who, during the summer compliance period, "sell, offer for sale, dispense, supply, offer for supply, or transport gasoline whose Reid vapor pressure exceeds the applicable standard."[186] EPA does not have authority to order violators to reblend gasoline found to have excess Reid Vapor Pressure. The agency cannot close the facilities of violators; nor can it issue "stop sale" orders to prevent further distribution of noncomplying gasoline. EPA's "compliance club" is the civil penalty.

Violations can subject the offender to a maximum civil penalty of $10,000 per day, per violation. Factors such as

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[184] 42 U.S.C. § 7545(c) (1989).

[185] Final Rulemaking-Phase I, supra note 56, at 11,879.

[186] 40 C.F.R. § 80.27(a) (1989); "Gasoline means any fuel sold in any State for use in motor vehicles and motor vehicle engines, and commonly or commercially known or sold as gasoline." 40 C.F.R. § 80.2(d) (1989).

the amount of non-complying fuel, the amount of psi by which the fuel exceeded the designated RVP limit, and the agency's desire to insure fines deprive the violator of any economic gain made through his violation, may all impact on the size of a civil penalty set by EPA.[187] If necessary, the government may, (within the Clean Air Act's five year statute of Limitations), bring suit in the district court where the violator has his principal office, or any other district in which the defendant is conducting business.[188]

A facility found with non-complying fuel during the regulated period may escape liability if it affirmatively proves the high RVP gasoline is in storage.[189] Limited storage facilities and simple economics make it impractical for most participants in the industry to keep stocks of high volatility fuel on hand throughout the summer. High volatility fuel is unlikely to be found "in storage" until just before the mid-September end of the compliance period. Even then it may be unlikely, since the defendant has the burden of proving the high volatility stock on-hand is not intended for distribution

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[187]*Fuel Facilities in Distribution Chain Presumed Liable for Volatility Violations*, 20 Env't. Rep. (BNA) No. 1, at 13, 14 (May 5, 1989).

[188]40 C.F.R. § 80.5 (1989).

[189]Officials of the Operations and Support Division, Office of Mobile Sources, U.S. EPA, as reported in, *Fuel Facilities in Distribution Chain Presumed Liable for Volatility Violations*, supra note 187, at 13-14.

during the compliance period.[130]

Gasoline production, transportation, storage and marketing create opportunities for "innocent" third parties to come into possession of stocks of gasoline exceeding EPA's RVP summer standards. Although brand specific detergents and other additives may be added prior to its final distribution, each grade of gasoline is essentially a fungible good.[131]

Despite the popular image of vertically integrated, oligopolistic, "Big Oil;" there are still numerous participants at the various levels of the gasoline market. Importers may have no corporate connection with their sources of foreign gasoline. Even the very largest companies may purchase gasoline from other companies through "exchange agreements".[132] Pipeline and trucking companies act as common

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[130] *EPA to Enforce New RVP Rules to the Letter Beginning June 1*, OIL & GAS J., May 8, 1989, at 20.

[131] Refiners add colored dyes to all gasolines except unleaded Regular. [eg. Bronze/yellow=leaded Regular; Reds=leaded Premium; blue=aviation fuel]. The dyes function as a means for pipeline companies to readily check on which grade is in transit at any given point in their line. There are only about 30 different dyes in use. Since lots are stored (and thus mixed) in common tanks at the midstream and downstream stages of the market, even if a dye was unique to a given refiner, it might be an impractical means of tracing accountability for an RVP violation. JACA Corp., Final Report: Liability for Violations of Gasoline Volatility Regulations 5-7 (September 30, 1986)(available in EPA Docket A-85-21 as Document II-A-36).

[132] For example, Getty Petroleum Corporation operates 2500 owned, leased or affiliated service stations in eleven New England and Mid-Atlantic States. The Corporation operates four bulk terminals of its own, but supplies many of its stations through exchange agreements with nine other bulk terminals. Affidavit of Alvin Smith, Senior Vice-President

carriers for a variety of companies. Independent chains and unbranded retail outlets may routinely obtain their gasoline from a shifting gamut of sources. Gas stations may be company owned, but many are owned by individuals. These retailers may have no means to control, or even test the RVP level of the gasoline they receive from the refinery or bulk plant. On their part, the bulk terminals, bulk plants, and refineries may not be able to prevent retailers from adding the low RVP gasoline they supply to storage tanks with high RVP gasoline, creating a mixture which does not meet EPA standards.

Faced with these complexities in the market structure, EPA adopted a "vicarious liability" approach it had already employed in its fuel contamination regulations.[133] In essence, even a trader who buys and then sells gasoline without ever having taken physical possession of the fuel may still be presumed liable for its excess RVP.[134] For all participants in

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Getty Petroleum Corp., American Petroleum Institute v. Jorling, 710 F. Supp. 421 (N.D. N.Y. 1989).

[133]Proposed Rulemaking, *supra* note 10, at 31,306. The liability rules for fuel contamination are found at 40 C.F.R. § 80.23 (1989); 38 Fed. Reg. 1255 (January 10, 1973); as amended at 39 Fed. Reg. 42,360 (December 5, 1974), and 42 Fed. Reg. 45,307 (September 9, 1977).

[134]Richard Kozlowski, Director, Field Operations, USEPA, in response to questions at a public meeting in Arlington, Virginia, April 28, 1989; as reported in, *Fuel Facilities in Distribution Chain Presumed Liable for Volatility Violations*, *supra* note 187, at 13. Because of the industry practice of using "exchange agreements" to supply retail outlets geographically remote from a refiner's own facilities; it is perfectly conceivable that refiner "X" could be held liable for non-complying gasoline found at an "X-brand" station which was in fact refined and distributed by company "Y".

the market, the best defense is to affirmatively demonstrate the violation was caused by somebody else.

"Upstream" refiners[135] and importers[136] are held solely liable for excessive RVP in gasoline found at their facilities.[137] They may also remain liable for excessive RVP found in gasoline they supplied to "midstream" carriers,[138] branded distributors and resellers,[139] and to unbranded distributors and ethanol blenders.[200] "Downstream" the refiners and importers may be held liable for noncomplying gas found at their <u>branded</u> retail outlets[201] and at <u>branded</u>

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[135] "Refiner" means any person who owns, leases, operates, controls, or supervises a refinery." "Refinery" means a plant at which gasoline is produced." 40 C.F.R. §§ 80.2(h)-(i) (1989).

[136] "Importer" means a person who imports gasoline or gasoline blending stocks or components from a foreign country into the United States..." 40 C.F.R. § 80.2(r) (1989).

[137] 40 C.F.R. § 30.28(a) (1989).

[138] 40 C.F.R. § 80.28(b)(2) (1989). "A carrier means any distributor who transports or stores or causes the transportation or storage of gasoline without taking title to or otherwise having any ownership of the gasoline, and without altering either the quality or quantity of the gasoline." 40 C.F.R. § 80.2(t) (1989).

[139] 40 C.F.R. § 80.28(c)(3) (1989). "Distributor means any person who transports or stores or causes the transportation or storage of gasoline at any point between any gasoline refinery or importer's facility and any retail outlet or wholesale purchaser-consumer's facility." 40 C.F.R. § 80.2(l) (1989). "Reseller means any person who purchases gasoline identified by the corporate, trade, or brand name of a refiner from such refiner or a distributor and resells or transfers it to retailers or wholesale purchaser-consumers displaying the refiner's brand, and whose assets are not substantially owned, leased, or controlled by such refiner." 40 C.F.R. § 80.2(n) (1989).

[200] 40 C.F.R. § 80.28(d)(3) (1989). "Ethanol blender means any person who owns, leases, operates, controls, or supervises an ethanol blending plant." 40 C.F.R. § 80.2(v) (1989).

[201] "Retail outlet" means any establishment at which gasoline is sold or offered for sale for use in motor vehicles." 40 C.F.R. § 80.2(j) (1989).

wholesale purchaser-consumer facilities.[202]

In their defense, refiners and importers may attempt to prove noncomplying gasoline found in possession of carriers, unbranded distributors or ethanol blenders was in compliance when it left their facilities, and its excess RVP was not the fault of their own agents or employees.[203] For violations at branded distributor, reseller and ethanol blending facilities, and for violations at branded wholesale purchaser-consumer and retail outlets, the refiners and importers are liable unless they can prove the violations were caused by:

- Sabotage or vandalism by third parties;[204]
- Actions by one of those midstream or downstream parties in violation of contractual provisions imposed by the refiner/importer, and despite reasonable sampling and testing efforts by the refiner/importer to verify compliance;[205]
- A carrier or other party, not subject to contract with the refiner/importer but engaged solely to

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[202] 40 C.F.R. § 80.28(e)(4) (1989). "[A] 'Wholesale purchaser-consumer' means any organization that is an ultimate consumer of gasoline and which purchases or obtains gasoline from a supplier for use in motor vehicles and receives delivery of that product into a storage tank of at least 550-gallon capacity substantially under the control of that organization." 40 C.F.R. § 80.2(o) (1989). Again, an exchange agreement could leave a refiner who did not actually manufacture or import the non-complying gasoline sold under its name, liable in this situation, as well.

[203] 40 C.F.R. § 80.28(g)(2) (1989).

[204] 40 C.F.R. § 80.28(g)(4)(iii)(A) (1989).

[205] 40 C.F.R. §§ 80.28(g)(4)(iii)(B)-(D) (1989).

transport the gasoline to midstream or downstream parties. The defendant must demonstrate reasonable effort to inspect or specify the carrier's equipment;[206]

- (For violations found in the stocks of a wholesale purchaser-consumer), the evidence must show the violation was caused by a reseller or ethanol-blender intermediary, operating in violation of contractual provisions with the refiner/importer.[207]

Carriers are liable for violations found in fuel stored at their facilities or found in their vehicles;[208] unless the carrier proves:

- The bills of lading, invoices etc. received from his shippers represent the fuel as in compliance;
- And, the carrier maintained a program periodically sampling and testing incoming gasoline;
- And, the violation was not caused by the carrier or his agents.[209]

"Midstream" branded distributors, reseller facilities, and ethanol blending plants, as well as unbranded distributors and ethanol blending facilities are also fully liable.[210] For

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[206] 40 C.F.R. § 80.28(g)(4)(iii)(E) (1989).

[207] 40 C.F.R. § 80.28(g)(4)(iii)(F) (1989).

[208] 40 C.F.R. § 80.28(b) (1989).

[209] 40 C.F.R. § 80.28(g) (1989).

[210] 40 C.F.R. §§ 80.28(c)-(d) (1989).

them, a successful defense requires proof of the same elements demanded of the carriers.[211] Ethanol blenders have the additional burden of proving their blend contained no more than 10% ethanol (by volume) at the time of its receipt by the next party in the distribution system.[212]

The "downstream" retailers and wholesale purchaser-consumers, whether of branded or unbranded gasoline, may be considered to be more leniently treated. These operators are also presumed liable for non-complying gasoline found on their premises.[213] A retailer who knew from his invoices that his storage tanks held non-complying gasoline, could not dispense that fuel during the regulated period and maintain a successful defense; but, the regulation does not require them to sample or test their gasoline. This removes a significant financial and administrative burden from the "downstream" parties. In their defense they need only prove that they, their agents and employees did not cause the violation.[214] If the invoices which they receive from their suppliers do not suggest an RVP problem on their face, their defense may be relatively easy. Since the noncomplying gasoline is in their possession, they may be able to affirmatively "prove" they are not responsible for its high RVP by simply denying any

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[211] 40 C.F.R. § 80.28(g)(3) (1989).

[212] 40 C.F.R. § 80.28(g)(6) (1989).

[213] 40 C.F.R. §§ 80.28(e)-(f) (1989).

[214] 40 C.F.R. § 80.28(g)(5) (1989).

tampering with the product.

As adopted by EPA, Phase I made one further distinction between these end-users and the other participants in the market. For retailers and wholesale purchaser-consumers, enforcement of the summer RVP limits only begins 1 June, not 1 May as for everyone else.[215] This two-date provision benefits the upstream and midstream participants in the market, as well as the retailers and wholesale purchaser-consumers. It directly addresses the leadtime problem raised during the comment period. Refiners, bulk terminals and other key players still must be in compliance by the start date, which is now set two weeks earlier than in the initial proposal. Nonetheless, with the staggered enforcement dates, refiners can switch to production of low RVP fuel later in the spring because the small volume retailers have an additional month to dispense or reblend their high-RVP gasoline in order to be in compliance. EPA expects refiners will be producing summer grade gasoline for only about six months.[216]

Throughout May, the retailers and wholesale-consumers receive shipments of the low RVP gasoline the upstream and midstream parties are required to have on hand. High-volume retailers can be expected to quickly exhaust their stocks of high RVP fuel early in May. The busiest stations can be

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[215] 40 C.F.R. § 80.27(a) (1989).

[216] Beginning about six weeks prior to May 1 and ending one before the September 15 termination date. FRIA: PHASE II REGULATIONS, supra note 7, at pp. 4-10, 5-5.

expected to be dispensing low RVP gasoline through most of the month. EPA felt the staggered enforcement dates would still attain most of the emission reductions desired for the 4 1/2 months of the regulated period.[217]

G. The Record for 1989

Because it published its final rule only in late March, EPA pushed the 1989 enforcement dates back by 30 days. Enforcement began June 30, for retailers and wholesale purchaser-consumers; and began June 1 for the midstream and upstream participants in the market. (Respectively 100 and 70 days after the March 2, 1989 publication date).[218]

Despite its curtailed enforcement period, EPA did undertake an active inspection program in the debut year of its RVP program. About 75% of sampling was conducted at the retail level, and 25% at "upstream" facilities.[219] In total, agency inspectors drew 3,295 samples at 2,210 facilities. Among the samples, agency tests found 233 (7.1%) which exceeded the designated EPA RVP limit for that location and month. These violations were detected at 184 (8.3%) of the 2,210 facilities checked. As of May 1990, the agency had

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[217]Final Rulemaking-Phase I, supra note 56, at 11,869.

[218]*id.*

[219]MASS. PROGRAM REPORT, supra note 69, at 15 (quoting U.S. EPA data).

forwarded 68 Notices of Violation for 1989 RVP violations.[220]

EPA enforcement officials believe, that except for Texas, compliance did not appear to place major strains on the gasoline supplies or prices in 1989.[221] Within Texas, supply problems and severe pricing distortions occurred throughout the state. At least part of the blame was linked to the necessity for refiners and distributors to meet two separate regulatory schemes. (EPA had followed the ASTM example by dividing the state at 99° longitude). After requests from the state governor and various marketing associations, EPA is planning to initiate rulemaking in August 1990. EPA will propose to set one standard for Texas, using the more restrictive standard currently applicable only to western

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[220]Telephone interview with Al Mannato, Operations and Support Division, Office of Mobile Sources, U.S. EPA (July 3, 1990).

[221]Petroleum industry sources might disagree. Spot shortages occurred in Colorado and North Carolina as well as Texas. Few retailers actually ran out of gasoline, but tank trucks had to drive to more distant terminals and wait for longer periods to receive shipments of complying low RVP gasoline. *Fuel-Switching for Power More Limited Than Thought; Refinery Flexibility During Emergency Supply Disruptions*. 81 NATIONAL PETROLEUM NEWS No. 8, at 28 (August 1989). The combination of traditional summertime high consumer demand and the need to find additional gasoline to replace butane affected the futures market. On April 28, 1989 May gasoline futures were priced at 78 cents/gallon, while September futures were only 59 cents/gallon. The price of a barrel of gasoline briefly skyrocketed from $ 22/barrel in March 1989 to $ 32/barrel in May 1989. Williams, *U.S. Refiners May Face Gasoline Supply Crunch in Driving Season*, OIL & GAS J., June 5, 1989 at 23 (Table: "How crude and products prices have varied") and at 24.

Texas.[222]

In its first year, RVP regulation did not seem to affect prices in the Natural Gas Industry.[223] This price stability may not continue in the future, especially after 1991. Observers did attribute some natural gas plant shutdowns to just the first summer of Phase I regulation.[224]

At this point, 1989's actual (versus projected) reductions in VOC emissions have not yet been determined. A fair assessment as to whether RVP reduction actually results in reduced ozone problems, can best be made only after several summers' worth of observation and data collection.

The 1989 program did reduce Reid Vapor Pressure. The average RVP of all samples tested by EPA in 1989 was 9.3 psi. This was well below the 10.5 limit legally applicable to most of the country's population, for most of the summer. It was also a full pound per square inch below the average RVP for in-use gasoline found by the Motor Vehicle Manufacturers'

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[222]Mannato interview, supra note 220; and see, Notice of Final Rulemaking, *Volatility Regulations for Gasoline and Alcohol Blends Sold in Calendar Years 1992 and Beyond*, 55 Fed. Reg. 23,658, 23,659 (June 11, 1990)[hereinafter Final Rulemaking-Phase II].

[223]"An examination of 1988 monthly spot market prices for ethane and propane, as well as butanes and pentane, shows no identifiable changes in the prevailing cost trends as a result of the implementation of Phase I RVP controls...Recent changes in the refining industry also appear to bear out EPA's beliefs. MTBE plants are already being built which utilize field butanes. In addition, ethylene producers appear to be using increased amounts of butane...These increases seem to be occurring at the expense of naphtha and residual (which, in turn, can be used for gasoline production)." FRIA: PHASE II REGULATIONS, supra note 7, at p. 4-13.

[224]Donald D. Biggs, Pennzoil Products Co., Roosevelt, Utah (quoted in, *NPRA Q&A-I, 1990's Fuel Specifications Will Require Process Changes*, OIL & GAS J., February 26, 1990, at 83, 85.

Association during the summer of 1988.[225]

Preliminary data, drawn from one curtailed summer of operation, should be viewed cautiously. Only a small fraction of the total market was tested. If all had been service stations, the 2,210 facilities tested would have represented only .5% of the nation's total of 400,000. A multitude of factors affects supply, demand and pricing. The market distributes the burden of compliance unequally, and individual participants do not necessarily recognize specific costs tied to RVP regulation.[226] The full, long term scope of the costs and market stresses posed by Phase I have probably not had time to surface.

VIII. The Advent of State Air Quality RVP Regulation Outside California

A. NESCAUM Agrees to Regulate

In February 1987, representatives of the eight states[227]

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[225]Mannato interview, supra note 220.

[226]Midwestern retail prices increased about 14 cents/gallon in one month. But it is impossible to attribute what part of those increases belong to the RVP regulation, and how much can be attributed to the Exxon Valdez cut-off of Alaskan crude oil supplies and to renewed OPEC solidarity in pricing policies. Abcede, *Summer Prices to Soar as Waves from OPEC, EPA Hit Midwest*, 61 NATIONAL PETROLEUM NEWS No. 6, at 12 (June 1989).

[227]Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

comprising the "Northeast States for Coordinated Air Use Management" [NESCAUM] announced they were considering a "Northeast Gasoline Volatility Reduction Strategy." NESCAUM was formed in 1967 by the Conference of State Public Health Officials following a recommendation of the New England Governors' Conference. (New York and New Jersey had each joined the organization by the late 1970's). Each state is officially represented at its annual September meetings by its Air Commissioner.[228]

In March 1987, NESCAUM met and solicited comments from oil industry representatives. The next month the organization conducted a so-called "Regional Regulatory Forum" to receive comments on their proposal. On November 12, 1987, the Commissioners of the eight states entered a Memorandum of Understanding in which they proposed to implement in each of their states, a program to reduce fuel volatility.[229] In their Memorandum, the Commissioners found that high gasoline volatility was a significant contributor to ozone violations throughout the northeastern United States, and a regionwide, uniform regulation was desirable. The commissioners proposed

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[228]Further information is available from, Northeast States for Coordinated Air Use Management, 85 Merrimac Street, Boston, Massachusetts 02114.

[229]Chronology obtained from, Comments of Michael J. Bradley, Executive Director, NESCAUM at Public Hearing, New York Department of Environmental Conservation, *Proposed Amendment to New York State Air Pollution Control Regulation, Section 225-3: Fuel Composition and Use-Motor Fuels, to Limit Gasoline Volatility* 3 (August 3, 1988).

a two step process in which the states would "return" to a summertime 9.0 psi limit, which was the voluntary standard allegedly followed by the petroleum industry in the 1970's.[230]

If the NESCAUM Memorandum of Understanding was an Interstate Compact, it could not be binding upon either the states or the regulated parties, absent the explicit approval of Congress.[231] The MOU does not describe itself as an interstate compact. The signatures of the state Air Commissioners did not bind their states' to the enforcement of any RVP standard, and created no legally enforceable right for any state against the other signatories. By its own terms, the MOU was simply an undertaking by the air Commissioners to pursue separate rulemaking procedures in their own states.[232]

The NESCAUM action cannot be attacked as a violation of

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[230]The text of the MOU is found at Appendix VII.

[231]42 U.S.C. § 7402(c) (1989) and U.S. CONST. art. I, § 10, cl. 3 and art. VI, cl. 2.

[232]"Specifically, each of the undersigned state Commissioners intends to propose a gasoline volatility control program..." Northeast States For Coordinated Use Management (NESCAUM), Memorandum of Understanding Between the Environmental Commissioners of the Northeast States on the Control of Gasoline Volatility, (November 12, 1987) (full text at Appendix VII). However, a New York State Department of Environmental Conservation fact-finding panel assembled to evaluate whether NYSDEC needed to conduct rulemaking to grant exceptions from enforcement of its RVP regulation due to prospective gasoline shortages consisted of: a representative from the state's Energy Office, a representative from NYSDEC, and one each from the New Jersey Department of Environmental Protection and the Massachusetts Department of Environmental Quality Engineering. Letter from Thomas Allen, Acting Director, Division of Air Resources, NYSDEC, to Ms. Vickie S. Jones, Esq., Mobil Oil Corporation 2 (January 3, 1989).

Antitrust law; in fact there would probably have been a better antitrust case against the oil industry for its reliance upon the ASTM standards than against the NESCAUM states.[233] A violation of antitrust law requires:

- An agreement by two or more persons or businesses;
- Designed to harm or restrain competition;
- And which actually does injure competition.[234]

Insurmountable statutory and case law obstacles confronted any antitrust challenge to the NESCAUM 9.0 RVP limit. The eight states' regulatory actions might affect the marketing of gasoline, but they were not designed to restrain competition or favor some companies at the expense of others. Furthermore state governments are not included in the definition of those "persons" even subject to the statute.[235] In the case law, the "state action exemption,"[236] or

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[233]The Supreme court has upheld an antitrust violation against a society of mechanical engineers responsible for setting an industrial code. American Society of Mechanical Engineers, Inc. v. Hydrolevel Corp., 456 U.S. 556 (1982).

[234]15 U.S.C. §§ 1-7 (1989); and National Basketball Association v. SDC Basketball Club, 815 F.2d 562, 567 (9th Cir.1987), cert. *dismissed sub. nom.*, Los Angeles Memorial Coliseum Commission v. National Basketball Association 484 U.S. 959 (1987).

[235]15 U.S.C. § 7 (1989).

[236]"Restraints" on trade which are the result of "...clearly articulated and affirmatively expressed state policy...actively supervised by the state itself..." are valid government action, immune from Sherman Act enforcement. NESCAUM could be viewed as a quasi-official agency seeking to research, develop and coordinate actions of the member states. California Liquor Dealers v. Midcal Aluminum, 445 U.S. 97, 105 (1980).

alternatively, the *Noerr-Pennington Doctrine*,[237] each precluded the possibility of a successful action in Antitrust.

No state actually adopted the proposal's first step, an interim RVP limit of 10.0 psi for the summer of 1988. However, all but one of the NESCAUM states eventually did adopt the "second" step, a 9.0 psi limit.[238] Figure 8 summarizes the progress and enforcement provisions of the various states' rulemaking.[239]

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[237]"No violation of the Act can be predicated upon mere attempts to influence the passage or enforcement of laws." Eastern Rail Road Conference V. Noerr Motor Freight, 365 U.S. 127, 135 (1961); United Mine Workers of America v. Pennington, 381 U.S. 657 (1965); cf. Allied Tube & Conduit Corp. v. Indian Head, Inc., 486 U.S. 492 (1988). NESCAUM could be viewed as a quasi-private organization of state officials seeking to influence states to enact specific policies.

[238]Due to "political factors" New Hampshire has not initiated rulemaking. Telephone interview with Nancy Seidman, Special Projects Director, NESCAUM (July 2, 1990).

[239]Data summarized from three sources: Comments of Michael J. Bradley, *supra* note 220, at 3); NESCAUM Volatility Strategy, Fact Sheet, Northeast States for Coordinated Air Use Management (March, 1989); and American Petroleum Institute, Summary of Final Gasoline Volatility Rules: Point of Enforcement and Penalties, (30 January 1989).

Summary of NESCAUM 9.0 RVP Rules

State	Hearings	Final Rule	Penalties
Massachusetts	February 1988	April 1988	$5,000 misdemeanor $10,000/ea. repeat offense
Maine	April 1988	September 1988	$25,000 criminal $10,000/day civil
Rhode Island	April 1988	August 1988	$1000/day
Connecticut	June 1988	December 1988	$25,000+$1,000/day violation cont.
Vermont	July 1988	January 1989	$2000/offense, exceedance beyond 30 days = new offense
New York	August 1988	January 1989	$5,000 civil penalty/violation
New Jersey	August 1988	February 1989	$5,000 civil penalty/violation

Figure 8

The NESCAUM program differed in scope from the other non-California RVP programs. The NESCAUM program was not a "consumer protection" program designed to insure the customer received gasoline which did indeed comply with industry specifications. The NESCAUM regulation was explicitly designed as an antipollution measure. NESCAUM limited the state regulatory effort to the ozone season. The individual states issuing regulations were expected to set the RVP limit at 9.0 psi from 1 May to 15 September.

NESCAUM was motivated by the states' desire to meet the National Ambient Air Quality Standards [NAAQS] for ozone. In every one of the eight states, except Vermont, at least one Air Quality Control Region [AQCR] had been listed by EPA as "Nonattainment" for ozone. At the time the MOU was signed, the number of ozone exceedances had doubled between the summer of 1986 and the summer of 1987. The sense of urgency was compounded by the hot summer of 1988, which was well underway

by the time rulemaking hearings started in most of the states. The Northeast had 43 non-attainment days in all of 1987. By July 23, 1988, ozone NAAQS exceedances had already reached 38.[240]

The NESCAUM staff found four attractions in the RVP strategy:

1) Substantial reduction in HC emissions as compared to alternative strategies;

2) Relative cost-effectiveness as compared to other strategies;

3) Enforcement was expected to impose little additional effort or cost on existing state programs;

4) NMHC emission reductions would be achieved in the near-term.[241]

Although it was not expressly stated by the state Commissioners, another very strong imperative lay behind the MOU and the rapid adoption of its proposed 9.0 psi standard. In November 1988, EPA published its Proposed Policy for Nonattainment Areas.[242] This plan proposed requiring nonattainment states to prove annual emissions reductions of 3% or better in the criteria pollutants for which they were nonattainment. Although challenging in itself, the "kicker" in EPA's proposal was its tentative decision to deny states

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[240]Comments of Michael J. Bradley, supra note 229, at 1.

[241]Seidman & Ernst, supra note 63, at 1.

[242]Proposed Policy, *State Implementation Plans: Approval of Post-1987 Ozone and Carbon Monoxide Plan Revisions for Areas Not Attaining the National Ambient Air Quality Standards: Notice*, 52 Fed. Reg. 45,044 (November 24, 1988).

SIP "credit" toward the 3% reduction goal for those reductions obtained through federal programs.[243] Putting state RVP programs in place prior to EPA's adoption of a national program may have been seen as a means of preserving potential credits for ozone and VOC reductions.

Initially, the projected VOC reduction expected from this regional strategy was 68,000 tons during the four and one-half month long control period. During the regulatory process, NESCAUM projections became more optimistic. First, NESCAUM speculated reducing the RVP would also reduce evaporative, "running loss emissions" from in-use vehicles on warm days. This raised NESCAUM's expected savings to 150,000 tons. Then NESCAUM staffers accepted oil industry testimony that, because of its market structure, compliance with the NESCAUM standard in the NESCAUM states would also require them to distribute 9.0 psi gasoline to non-NESCAUM states (Virginia, Maryland, Delaware and Pennsylvania). Since the northeast states are "downwind" from those states, the NESCAUM staff raised their projected VOC reductions to "over 200,000 tons" each year.[244]

In factoring the cost of their program, the NESCAUM staff included the expected, but undemonstrated reductions in

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[243] *id.* at 45,066.

[244] Comments of Michael J. Bradley, supra note 229, at 4; and see, *Most Northeast States to Have Final Rules on Fuel Volatility Before 1989 Ozone Season*. 19 Env't. Rep. (BNA) No. 37, at 1835 (January 13, 1989).

vehicle running losses. By doing so, NESCAUM cut EPA estimates of the "cost per ton" of VOC emission reduction in-half, to $500 to $1000 per ton, with an estimated cost to consumers of 1.5 cents per gallon.[245] Improved fuel economy was expected to amount to about .7%.[246] As a VOC reduction strategy, these costs compared favorably with VOC reductions Rhode Island and Connecticut were projecting in their State Implementation Plan revisions for thermal incinerators, ($2000-2500/ton and $4600/ton respectively).[247]

NESCAUM did not factor into its "cost-benefit" calculations the potential VOC emission increases at refineries in these other states and on the Gulf Coast. Production of the 9.0 gasoline refinery increases refinery emissions because more crude oil must be used to produce the same volume of gasoline, and through the possible necessity

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[245]Studies commissioned by the petroleum industry suggested costs would reach 3 cents per gallon. With either estimate the cost per year per driver was thought reasonable: A driver getting 20 miles per gallon with his vehicle, and averaging 15,000 miles per year could expect to pay an extra $11.25 or $22.50 each year for gasoline, omitting any savings from gains in fuel economy. New York State Department of Environmental Conservation, Proposed Adoption of a New Air Pollution Control Regulation: 6 NYCRR 225-3 "Fuel Consumption and Use--Motor Fuel" Issue 27 (no page number)(undated).

[246]As measured by a reduction from 11.5 psi to 9.0 psi RVP gasoline. Defendant's Brief at 35, American Petroleum Institute v. Jorling 710 F. Supp. 421 (N.D. N.Y. 1989).

[247]Comments of Michael J. Bradley, supra note 229, at 5.

of using "severer" processes to restore lost octane.[248] Incineration of now excess butane and pentane, or the possible increase in truck and train traffic needed to remove them from refinery sites can also increase pollution in refining states.

NESCAUM's 9.0 level was more stringent than the proposed federal Phase I standard, which only imposed a 10.5 psi limit in the Northeast. EPA intended to adopt a 9.0 psi standard in the Northeast, but only beginning with the summer of 1992.[249] Under the ASTM plan, 9.0 gasoline had only been used in west Texas, New Mexico, Arizona and southern Nevada and southeastern California. California had imposed its 9.0 psi limit statewide under its Clean Air Act exception. There is a significant climatic difference between these areas and the Northeast. In the April "transition" period, California's average temperatures are 10^0 to 20^0F warmer than average northeastern state temperatures.[250]

As initially proposed, the EPA Phase I program was to begin 16 May. From its beginning, the NESCAUM plan called for a May 1 enforcement date. This starting date, in

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[248]Letter from U.V. Henderson Jr., Assistant Director for Environmental Affairs, Texaco Inc. to Harry H. Hovey, Director, Division Air Resources, NYSDEC (January 13, 1988).

[249]See generally Part VII, Sections C and D, supra.

[250]Supplementary Information to Comments of Mobil Oil Corporation to New York State Department of Environmental Conservation on Proposed Air Pollution Control Regulation 6 NYCRR Subpart 225-3 "Fuel Composition and Use--Motor Fuel" 3 (August 3, 1988).

combination with the low RVP had vehicle performance ramifications; particularly in the critical period before the 1 May enforcement date. Low RVP gasoline could be expected to be at many gas stations by mid-April, and in some cases before the end of March: a period in which inland areas of the NESCAUM states can experience weather completely unsuitable for the use of 9.0 psi gasoline.[251]

Coordinating Research Council [CRC] tests of sixteen 1980 automobiles at 0^0-20^0F recorded an increase in stalls from one per trip to three per trip when their gasoline was switched from a Reid Vapor Pressure of 13.1 to one of 8.9 pounds per square inch.[252] A 1984 test by CRC used six 1979 and thirty 1984 model year vehicles, comparing 8.6 psi and 10.7 psi gasoline at temperatures ranging from 40^0F to 60^0F. Although some cars were not affected by the change, on average, stalls increased three-fold with the lower RVP gasoline.[253] With a view toward pending EPA and NESCAUM RVP regulation, the

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[251]On average, upstate New York experiences freezing temperatures during half the days in April, and two days in May. Statement of Jerrold Levine, Director of Corporate Studies, AMOCO Oil Company, before the New York Department of Environmental Conservation (unnumbered)(August 4, 1988).

[252]Comments of W.J. Koehl, supra note 84, at 4 [quoting COORDINATING RESEARCH COUNCIL, EFFECTS OF FUEL VOLATILITY ON DRIVEABILITY OF 1980 MODEL CARS AT LOW AND INTERMEDIATE AMBIENT TEMPERATURE (CRC Project No. CM-118-80)(March, 1982)].

[253]Comments of W.J. Koehl, *id.* at 4 (quoting COORDINATING RESEARCH COUNCIL, 1984 CRC INTERMEDIATE TEMPERATURE DRIVEABILITY PROGRAM USING GASOLINE-ALCOHOL BLENDS (CRC Project No. CM-118-84)(August 1987)); [This data was compiled from tests of alcohol-free gasolines used in the program].

American Petroleum Institute and Mobil Oil Corporation tested 51 consumer owned automobiles of various makes, ranging from model years 1972-1988, in Portland, Maine during March of 1988. The test consisted of a "morning start and drive away" at temperatures ranging from 21°F to 30°F, after the car had been left overnight. Start stalls increased 80% with the switch from 13.5 o 9.0 psi gasoline; driving stalls occurred 2.8 times more often; "hesitations and stumbles" 2.6 times more often.[254]

In opposition to the oil industry position, the automobile manufacturers claimed vehicle performance would not be impaired by the switch to low RVP fuel.[255] In the view of NESCAUM experts, "driveability" problems can be cured by operator maintenance for ignition, carburetors and other engine parts; or in other cases, by simply extending vehicle warm-up periods.[256]

B. The New York State Litigation

On February 28, 1989, these measures led to the filing

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[254]Comments of W.J. Koehl, id. at 4-5.

[255]Defendant's Exhibit 7, Statement of Motor Vehicle Manufacturers' Association at Para. 13, American Petroleum Institute v. Jorling 710 F. Supp. 421 (N.D. N.Y. 1989).

[256]Affidavit of Dr. Richard Gibbs at Paras. 6-8, 10, Defense Exhibit 8, American Petroleum Institute v. Jorling, 710 F. Supp. 421 (N.D. N.Y. 1989).

of a lawsuit, American Petroleum Institute v. Jorling,[257] the first Clean Air Act related RVP litigation since Exxon Corp. v. City of New York. (Thomas C. Jorling was sued in his capacity as Commissioner of the New York State Department of Environmental Conservation [NYSDEC]).

The New York State Reid Vapor Pressure regulation was among the last to be adopted. The oil industry trade group, the American Petroleum Institute [API] had suggested the limits set by EPA in its Phase I regulations, and expressed its approval of the program after their promulgation.[258] The petroleum industry had seemingly been quite content to live with active state regulatory programs in California and at least nineteen other non-NESCAUM states.[259] Why did the oil business oppose the NESCAUM 9.0 psi regulation?

The NESCAUM plan called for production or import of substantial quantities of 9.0 RVP gasoline. The toughest and most expensive ASTM standard, Class A, used the 9.0 psi level. The leadtime, transportation and storage problems of the industry were complicated by the distance of the Northeastern states from their sources of supply; and exacerbated by the drastic jump from the April Class D ASTM standard to the Class A standard on 1 May. API and individual petroleum companies

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[257]710 F. Supp. 421 (N.D. N.Y. 1989).

[258]*Federal Fuel Volatility Regulations for Controlling Ozone Formation Issued by EPA*, 19 Env't. Rep. (BNA) No. 46, at 2460, 2461 (March 17, 1989).

[259]As discussed in Part VII, Sections B and C supra.

had not made court challenges to the NESCAUM 9.0 psi standard as it was adopted in other states. The New York regulation was chosen for challenge because of the disproportionate impact and costs New York's regulation imposed on the gasoline market. Also the industry perceived stronger factual and procedural issues supporting a challenge to the New York rule.[260]

The American Petroleum Institute alleged New York State's RVP regulation was preempted by the federal EPA standards and imposed an excessive burden on interstate commerce. There were also several state law issues.[261] It is not a function of this paper to discuss state law related issues at length, so they are summarized here. API alleged:

- NYSDEC had erred in its [arbitrary and capricious] expansion of the regulation to the entire state, even though only the nine county New York City Air Quality Control Region (AQCR) was non-attainment for ozone.
- NYSDEC was arbitrarily and capriciously imposing its regulation with so short a leadtime, it would result in fuel shortages and excessive price increases.

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[260]Interview with David Deal, Office of the General Counsel, American Petroleum Institute (June 11, 1990).

[261]A summary of the pleadings can be found at *Petroleum Institute Challenges New York on Rule Limiting Fuel Volatility in Summer*, 19 Env't. Rep. (BNA) No.45, at 2364-65 (March 10, 1989).

- Since NYSDEC could not specifically identify the VOC and ozone reductions which would be attained, the RVP regulation violated state statutes requiring regulations to be premised upon "scientific knowledge of causes as well as effects."
- More public comment was required, because of a "marked variation" between the original state proposal and the promulgated rule. NYSDEC had not announced its intention to submit its regulation to EPA as an SIP revision; and it had "belatedly" removed retailers from its sanctions provisions without sufficient opportunity for comments.

[1] The Preemption Issue

In its preemption argument, the oil industry seemed to have the legislative history on its side, as evidenced by this portion of the December 1970. Conference Committee discussion:

> Mr. Corman: May I enquire as to the composition of fuel. It is my understanding California has a different requirement concerning the composition of fuel than that established under the federal regulation. Will the state of California continue to be in a position to exercise police power in the field of composition of fuel?
>
> Mr Staggers: We must distinguish between fuels used in stationary sources and fuels used in motor vehicles. With regard to fuels used in stationary sources, all states are completely free to adopt and enforce more stringent emission standards. With regard to motor vehicles, all states with the exception of California, are preempted from imposing more stringent fuel

standards.[262]

Congress seemed to have been pretty explicit in preempting all states except California from regulating any fuel component regulated by EPA. Nonetheless, API's position was weakened by some inconsistent pronouncements of the Environmental Protection Agency.

EPA was on record that some control measures are most effectively implemented on a national level, *e.g.* "...where there is a large amount of VOC [volatile organic compound] emissions on a national scale, and a Federal standard clearly dominates locally derived standards...[or]...where a lack of national uniformity could lead to serious competitive problems affecting interstate commerce, or create other adverse impacts." EPA had listed "Regulation of Evaporative Emissions from Fuels" first, among all the "categories of emissions [which] should be controlled through regulations adopted at the national level."[263]

Despite this pronouncement, the agency position was ambivalent. After Exxon Corp. v. City of New York, EPA disagreed with the decision, opining that regulation of one fuel parameter (lead), did not preempt states from regulating

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[262]H.R. REP. CONFERENCE COMM., 93d Cong., 2d Sess. 113 (Comm. Print 1974).

[263]Proposed Policy, supra note 242, at 45,060-61.

other fuel parameters.[264] Just four months before the filing of the API suit against New York, EPA had approved a local regulation limiting gasoline oxygen content in Maricopa County, Arizona.[265] In NESCAUM SIP revision actions, EPA's Region I [New England] summarized their position:

> [The] proposed federal RVP control is not yet final. Therefore preemption has not yet occurred, and ...[Massachusetts]...is free to adopt and enforce its own RVP controls at this time.
>
> One court, in *Exxon Corp. v. City of New York*, 548 F.2d 1088 (2d Cir. 1977), has suggested that EPA's regulation of the lead content of gasoline amounts under subparagraph (ii) to the preemption of State controls of any aspect of the content of gasoline (unless identical to the federal lead content control). EPA does not agree with that holding and hence does not believe that reasoning should apply in cases involving State fuel regulations other than regulation of lead content.[266]

Within the confines of the Second Circuit, in which the API was bringing its challenge, Region I only reluctantly

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[264] "Nothing in this part is intended to preempt the ability of State or local governments to control or prohibit any fuel or additive for use in motor vehicles and motor vehicle engines which is not explicitly regulated by this part." 40 C.F.R. § 80.1(b) (1989), and see. *Regulation of Fuels and Fuel Additives; State and Local Governments Permitted to Control Certain Aspects*. 42 Fed. Reg. 25,731-32 (1977).

[265] Final Rule, *Approval and Promulgation of Implementation Plans; Arizona State Implementation Plan Revision; Maricopa County Carbon Monoxide Plan*. 53 Fed. Reg. 30,224, 30,228-29 (August 10, 1988).

[266] Proposed Rule, *Approval and Promulgation of Implementation Plans; Massachusetts Ozone Attainment Plan; Control of Gasoline Volatility*, 54 Fed. Reg. 7794, 7795 col 2 and n.1 (February 23, 1989)[hereinafter Proposed Rule: Mass.]; and see, Proposed Rule, *Approval and Promulgation of Implementation Plans; Rhode Island Ozone Attainment Plan; Control of Gasoline Volatility*, 54 Fed. Reg. 11,018 col. 3 and n.1 (March 16, 1989)[hereinafter Proposed Rule: R.I.].

felt bound by *Exxon Corp. v. City of New York*.[267] However, there was a counter note in some agency pronouncements:

> If a state's volatility controls are for the purpose of emission control, it is possible that they might be preempted even if EPA does not promulgate federal volatility limits, given EPA's existing regulation of other characteristics of in-use fuels.[268]

As the NESCAUM states publicized their Memorandum of Understanding, EPA noted the proposal and then cautioned:

> While the Agency generally encourages States with persistent nonattainment problems to consider all possible means to bring about attainment, the selection of measures affecting fuel content may, under section 211(c)(4) of the [Clean Air] Act, require an analysis of such issues as whether the State action has been preempted by Federal action.[269]

Then, just after the API filed its suit, EPA effectively undercut New York's position. On March 10, the agency promulgated its own (Phase I) volatility regulation. In its announcement, EPA expressly preempted all non-California state RVP regulations.[270]

EPA's explicit claim of preemption in its announcement posed a severe problem for the state. NYSDEC distinguished *Exxon Corporation v. City of New York* by noting the city in

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[267]Proposed Rule, *Approval and Promulgation of Implementation Plans Connecticut Ozone Attainment Plan: Control of Gasoline Volatility*, 54 Fed. Reg. 11,016 col. 3 (March 16, 1989)[hereinafter Proposed Rule: Conn.].

[268]Proposed Rulemaking, supra note 10, at 31,311 n.25.

[269]Proposed Policy, supra note 242, at 45,061 n.26.

[270]"[T]he Phase I RVP control program finalized today will preempt any state (except California) from enforcing RVP controls different from EPA's unless such a program is approved in a State Implementation Plan (SIP) or unless its purpose is something other than air quality improvement." Final Rulemaking-Phase I, supra note 56, at 11,882.

that case had not submitted its regulation to EPA for approval. New York argued there could be no preemption unless API proved not only that EPA had prescribed a regulation governing gasoline volatility; but that EPA had also "...denied New York's request for approval of its more stringent RVP rule." [271] If taken literally, this position would have allowed New York State to indefinitely enforce its state regulation without EPA approval, simply by never submitting its regulation to EPA as an SIP revision.

[2] Interstate Commerce Issues

A state regulation effectively controlling extra-territorial activities may be constitutionally prohibited.

> If the purpose or <u>effect</u> of a state's law is to regulate conduct occurring wholly outside the state, the burden on commerce is generally held impermissible, and the fact that the law may not have been intended as protectionist or discriminatory will not save it."[272] [Emphasis added].

Unquestionably, the NESCAUM 9.0 psi limit placed burdens on interstate commerce. Even given the legitimate goals of New York State's regulation, an argument could be made it placed on undue burdens on interstate commerce, since the "practical effect of such regulation is to control... [conduct] beyond the boundaries" of the state.[273]

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[271] Defendant's Brief at 17, 19-20, American Petroleum Institute v. Jorling, 710 F. Supp. 421 (N.D. N.Y. 1989).

[272] United States Brewers Association v. Healy, 692 F.2d 275, 279 (2d Cir. 1982) *aff'd mem.* 464 U.S. 909 (1983).

[273] Southern Pacific Co. v. Arizona, 325 U.S. 761, 775 (1945).

California's prior experience with 9.0 psi regulation was not really analogous to that created by 9.0 regulation in New York and the other NESCAUM states. California is both an oil producing and refining state. Most of the refining, distribution and marketing problems posed by its regulations are confronted and resolved entirely within its own boundaries. None of the NESCAUM states produces crude oil. NESCAUM receives most of its oil and gasoline from the Gulf Coast, the rest is imported from Europe and South America. Although about 70% of these shipments arrive as crude oil, except for New Jersey, the refineries are concentrated in the non-NESCAUM states of Delaware and Pennsylvania.[274] States with refineries have to undergo more pollution from those stationary sources as more petroleum is processed to maintain gasoline supplies.[275] Other examples of the interstate impacts of NESCAUM regulation include:

AMOCO estimated, allowing for transport, storage and blend downs of high RVP stock, its Gulf Coast refineries would have to switch their production cycle to 9.0 psi gasoline by February 1, if it was to be available at New York

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[274]Letter from David E. Knoll, President, Sun Refining and Marketing Company to New York State Senator James R. Hurley (February 8, 1989).

[275]"Other states (eg. New Jersey, Delaware and Pennsylvania) and the Gulf Coast will be adversely impacted because the regulations in Vermont (which has no operating refineries) will result in increased refining severity to make up octane losses and in higher throughput to replace lost volume. Thus, areas that have refineries that supply Vermont must accept increased emissions as a penalty for undefined environmental benefits in your state." Comments of Jerrold Levine, Director of Corporate Studies, AMOCO Oil, to Air Pollution Control Division, Agency of Natural Resources, State of Vermont 2-3 (July 6, 1988).

retailers by the May 1 compliance date.[276]

Because it had only limited means available to segregate 9.0 RVP fuel during transportation and storage; Texaco expected to produce and distribute 30% more 9.0 psi gasoline than could actually be consumed in the eight NESCAUM states. The excess would be distributed to Pennsylvania, Delaware, Maryland and other states which did not have the 9.0 limit.[277]

Colonial Pipeline Company is the United States' largest pipeline transporter of refined petroleum products. It transports 20% of the gasoline consumed in the northeastern United States. Colonial was concerned about the risk of product mixing and diversion. Because of the threat of direct or vicarious liability, Colonial refused to ship from Houston for delivery north of Baltimore, any gasoline exceeding 9.0 psi during the period March 2-August 21.[278]

To meet the burdens posed by the 9.0 limit in its New England, New York and New Jersey market, Sun Oil had to embark on an extensive program of capital investment in its

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[276]Letter from L.D. Thomas, President AMOCO Oil Co. to Mario Cuomo, Governor, New York State (January 31, 1989).

[277]Henderson Letter, supra note 247.

[278]In the pre-regulation era, Colonial Pipeline's northeastern United States' transportation schedule had looked like this:

Class E 15.0 psi gasoline.....December-January
Class D 13.5 psi gasoline.....February-April
Class C 11.5 psi gasoline.....May-September
Class D 13.5 psi gasoline.....October-November

Press Release, Colonial Pipeline Co. (January 23, 1989).

refinery, at Marcus Hook, Pennsylvania.[279] Compliance with the New York regulation also mandated a two year capital construction program at the refinery of a regional company, Atlantic Refining. This refinery is also located in southeastern Pennsylvania. To supply its customers in western New York, Atlantic employs a common carrier pipeline from Philadelphia to Pittsburgh, then north to Rochester and Tonawanda in western New York. All gasoline entering the pipeline would have to meet New York's 9.0 RVP standard, even if it was bound for western Pennsylvania markets.[280]

In northwestern Pennsylvania, the New York regulation posed a problem for the one, small refinery (60,000 barrels/day) operated by the United Refining Company. Its gasoline is distributed to 295 "Quik-Fill" stations located in eastern Ohio, western Pennsylvania and western New York. Only half was used by the New York stations. Compliance was going to require the company to change its process to actively remove butane, requiring capital investment to store, ship and/or incinerate the now excess butane. Worse, if United was to continue to supply all its stations with

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[279]Letter by Anthony Ippolito, Senior Consultant-Government Relations, Sun Oil Co. to Harold Garabedian, Acting Director, Vermont Department of Environmental Conservation (October 10, 1988).

[280]Testimony of John Malinowski, District Engineer, Atlantic Refining and Marketing Corp. before the New York State Department of Environmental Conservation on the Proposed Air Pollution Control Regulation 6 NYCRR Subpart 225-3 "Fuel Composition and Use--Motor Fuel" 12-13 (August 2, 1988).

gasoline processed at its own refinery, United's Ohio and Pennsylvania customers would have to be supplied 9.0 gasoline too. In those markets, the company faced competition from other western Pennsylvania and Central States refiners not subject to 9.0 regulation. Furthermore, United feared the poor startability of 9.0 RVP fuel during the all too foreseeable "spring transition period" Great Lakes cold snaps would alienate its Ohio and Pennsylvania customers.[261]

Western New York posed significant problems for the industry as a whole. Even at full capacity, pipelines from the Atlantic Coast terminals could not meet western New York demand. About 10,000,000 gallons per month of the shortfall normally was obtained from sources in the Central States and Canada. For them, Western New York is a peripheral market. These sources had no incentive or capacity to switch to production of 9.0 psi gasoline. Large price rises would be required to justify their investment in segregated 9.0 refining and storage facilities.[262]

Distribution of such high volumes of expensive low RVP gasoline outside the NESCAUM states posed interesting issues.

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[261]Testimony of Robert A. Wenom, representing United Refining Company, Warren, Pennsylvania before the New York State Department of Environmental Conservation hearings on Proposed Air Pollution Control Regulation 6 NYCRR Subpart 225-3 "Fuel Composition and Use--Motor Fuel" 24-25 (August 3, 1988).

[262]Comment of the New York State Energy Office before the New York State Department of Environmental Conservation on Proposed Air Pollution Control Regulation 6 NYCRR Subpart 225-3 "Fuel Composition and Use--Motor Fuel" 4-7 (March 2, 1989).

In order for NESCAUM residents to enjoy better air, "upwind" non-NESCAUM consumers were forced to purchase low RVP gasoline whose performance they might not like; and to pay a higher price to get it. Even those non-NESCAUM states not receiving 9.0 psi gasoline could expect to pay more for gasoline, as arbitrage spread the impact of the higher prices in the Northeast.[283] An EPA commissioned study predicted the shortages, market dislocations, and capital costs of the NESCAUM program would raise prices in the Northeast from 2 to 4 cents per gallon. Unfortunately, costs would not stop there. The demand for additional gasoline created by the NESCAUM 9.0 standard tends to "bid up" the price of all domestic and imported stocks of gasoline and crude oil. Consumers outside the Northeast would be paying an additional 1 cent per gallon of gasoline as well. If NESCAUM consumers were required to pay the entire national cost of the NESCAUM program, their price rise would be 7 to 9+ cents per gallon.[284]

New York State argued its regulation was "invulnerable" to challenge under the interstate commerce clause. The API's "dormant" commerce clause argument was misguided according to the state. The state cited *Norfolk Southern Corporation v. Oberly*:

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[283]Verleger, *Pay Attention to Old Adages...*, 8 CRA PETROLEUM ECONOMICS MONTHLY No. 2, at 1 (February, 1989).

[284]SOBOTKA AND CO., ANALYSIS OF FUEL VOLATILITY REGULATION BY NORTHEASTERN STATES at 2-3 (March 14, 1989). Plaintiff's Reply Exhibit 4, American Petroleum Institute v. Jorling, 710 F. Supp. 421 (N.D. N.Y. 1989).

> The dormant commerce clause, as the term 'dormant' implies, limits the powers of the states in areas where Congress has not affirmatively acted to either authorize or forbid the challenged state activity. One defense to a dormant commerce clause challenge is congressional consent. By its actions Congress may redefine the distribution of power over interstate commerce by permitting the states to regulate the commerce in a manner which would otherwise not be permissible.[285]

In the Clean Air Act itself, at 42 U.S.C. § 7545(c)(4)(C), Congress "affirmatively acted" to authorize state RVP rules. According to the state, the case was governed by the rule of "congressional consent" as it was described by the Supreme Court:

> If Congress ordains that the states may freely regulate an aspect of interstate commerce, any action taken by a state within the scope of the congressional authorization is rendered invulnerable to commerce clause challenge.[286]

[3] The District Court Rules on Motions

The court's actions on preliminary motions in this case are reported as *American Petroleum Institute v. Jorling*.[287] The District Court's decisionmaking was complicated by rapid developments in both the state and federal RVP rulemaking:

- The state submitted its RVP regulation to EPA as an SIP revision, 31 January 1989. EPA's Region II recommended approval 24 February 1989, four days

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[285] 822 F.2d 388, 392 (3d Cir. 1987).

[286] Western and Southern Life Insurance Company v. State Board of Equalization, 451 U.S. 648, 652-53 (1981); and see Northeast Bancorp, Inc. v. Board of Governors, 472 U.S. 159 (1985); and White v. Massachusetts Council of Construction Employees, Inc., 460 U.S. 204 (1983).

[287] 710 F.Supp. 421 (N.D. N.Y. 1989).

before API filed its suit.

- Between 2 and 6 March, NYSDEC conducted hearings to gather evidence concerning a potential summer gasoline shortage, and to consider whether to delay implementation of the 9.0 psi limit.
- On March 6, the American Petroleum Institute initiated a separate suit restricted to state law grounds in the New York State court system.
- On March 10, EPA announced its Phase I policy, which was then published in the 22 March Federal Register.
- Less than a week later, EPA proposed to approve New York's 9.0 RVP rule as a revision to its State Implementation Plan.[288]
- On March 28, Commissioner Jorling exempted western New York from enforcement during 1989 because of insurmountable supply difficulties.[289] He announced implementation in the eastern part of the state would be delayed one month [until June 1, 1989], or until 14 days after EPA approval of the SIP change.

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[288]Proposed Rule, *Approval and Promulgation of Implementation Plans; Revision to the State of New York Implementation Plan for Ozone*, 54 Fed. Reg. 12,656 (March 28, 1989)[hereinafter Proposed Rule: New York].

[289]"Western" New York included Broome [Binghamton], Chenango, Madison, Onondaga [Syracuse] and Oswego counties and all points west. New York State Department of Environmental Conservation, Exceptions Pursuant to Fuel Composition and Use-Volatile Motor Fuel 6 NYCRR 225-3.5, Commissioner's Determination 3-4 (March 22, 1989).

whichever was later.[230]

The court denied API's motion for a preliminary injunction because the trade association had failed to establish a threat of irreparable harm.[231] Citing the legislative history of the Clean Air Act, the precedent of *Exxon Corp. v. City of New York*, and EPA's promulgation of its own RVP program, the District Judge ruled the state's regulation was preempted by federal standards.[232] The court agreed the state can adopt such regulations as a State Implementation Plan revision but held EPA approval is a condition precedent to their enforceability. Even probable EPA approval was insufficient to end federal preemption. The judge specifically noted EPA had already published its proposed approval of the New York state regulation.[233] The judge also denied New York's motion to dismiss the suit.

Unfortunately, the opinion did not address the relative

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[230] *id.* at 2.

[231] The court found plaintiffs had not presented evidence that compliance with the state standards would require capital investment or other costs which could not be recouped. To the extent lowering RVP would reduce fuel performance and produce consumer dissatisfaction and loss of professional reputation for the sellers, all companies selling gasoline in New York would be suffering the same harm. Nor did the Constitutional claim amount to irreparable harm per se, since the Supremacy Clause claims did not involve "personal" constitutional rights. American Petroleum Institute v. Jorling, 710 F. Supp. 421, 431-433 (N.D. N.Y. 1989).

[232] American Petroleum Institute v. Jorling, 421 F. Supp. 421, 429 (N.D. N.Y. 1989).

[233] American Petroleum Institute v. Jorling, 710 F. Supp. 421, 430 (N.D. N.Y. 1989).

merit of the Commerce Clause arguments. To some extent, EPA's ultimate approval of the regulation as an SIP revision would have reinforced the state's position. Express Congressional authorization or even silence in reaction to regulatory actions of federal agencies may be viewed as "affirmatively permit[ting]" the state's activity.[234]

[4] Settlement

EPA announced it was approving the New York State Implementation Plan revision on 12 June, mooting the preemption issue.[235] The federal approval helped produce a settlement, which was signed June 30, 1989. New York agreed to accept intermediate "enforcement levels" of 9.4 psi RVP during the summer of 1989, and 9.3 psi RVP during the summer of 1990. Seven additional counties[236] were excluded from enforcement of the state limit during 1989, (though they remained subject to the new federal 10.5 RVP limit). API's action attacking the state's expansion of coverage to attainment counties was preserved.[237]

Later in 1989, API withdrew from its suits in both the

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[234]White v. Massachusetts Council of Construction Employees, Inc., 460 U.S. 204, 213 (1983).

[235]*Fuel Volatility Rules Approved for N.J., N.Y.*, 20 Env't. Rep. (BNA) No. 8, at 480 (June 23, 1989).

[236]Jefferson [Watertown], Lewis, Oneida [Utica-Rome], St. Lawrence [Massena], Herkimer, Otsego [Cooperstown] and Delaware.

[237]American Petroleum Institute v. Thomas Jorling, Settlement Agreement, No. 89-CV-238, at 2-3 (N.D. N.Y. June 30, 1989).

federal[298] and state court.[299] No longer facing legal challenge, and with its western state supply problems purportedly solved, in 1990 NYSDEC began enforcing the 9.0 psi limit throughout the state.[300]

C. NESCAUM SIP Revisions

Prior to EPA's promulgation of the Phase I rules, the NESCAUM air commissioners maintained there was no federal preemption of their state RVP rules. However, as "insurance", the NESCAUM states began submitting their regulations to EPA for formal approval as SIP revisions prior to both the publication of the Phase I rule and the District Court's decision on the preemption issue in *American Petroleum Institute v. Jorling*.

[1] Massachusetts

Massachusetts was the first NESCAUM state to adopt 9.0 RVP regulations, and the first to submit them to EPA. The state submitted its 9.0 psi regulation[301] as a proposed revision to its Nonattainment State Implementation Plan in July 1988. As months passed with no EPA approval and with

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[298]American Petroleum Institute v. Jorling, Civ. No. 89-CV-238, Stipulation Discontinuing Action (N.D. N.Y. November 21, 1989) (*ordered* J. McAvoy).

[299]Settlement Agreement, American Petroleum Institute v. Jorling, No. 1371-89 (N.Y. Sup. Ct. Albany 1989).

[300]Telephone interview with Robert Fraser, New York State Department of Environmental Conservation (July 9, 1990).

[301]MASS. ADMIN. CODE tit. 310, § 7.02(12) (1988).

summer drawing nearer, the state threatened to sue the agency because it was being denied the timely decision within the four months mandated by the Clean Air Act. (At that moment, EPA had over 100 other SIP revisions pending approval).[302] Perhaps in response to that spur, the agency did announce its proposed approval, February 23,1989.[303] Final approval was given 21 April.[304]

Once EPA explicitly declared federal RVP regulation to be preemptive in its announcement of Phase I, state regulations varying from the federal standard [except California's] could only be approved as part of a Nonattainment State Implementation Plan Revision under 42 U.S.C. § 7410.[305] SIP Revisions require EPA approval to become legally effective. EPA Administrator approval of SIP revisions is statutorily contingent upon a finding RVP or

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[302] 42 U.S.C. § 7410(a)(2)(1989); and Letter, dated December 22, 1988 from James M. Shannon, Massachusetts Attorney General, *reported in, Massachusetts Threatens Suit Against EPA for Alleged Delay on Proposed VOC Controls*, 19 Env't. Rep. (BNA) No. 36, at 1800 (January 6, 1989).

[303] Proposed Rule: Mass., *supra* note 286.

[304] Final Rule, *Approval and Promulgation of Implementation Plans: Massachusetts Ozone Attainment Plan; Control of Gasoline Volatility*, 54 Fed. Reg. 19,173 (May 4, 1989)[hereinafter Final Rule: Mass.]; *and see, Massachusetts Fuel Volatility Regulation, Stricter Than Federal Rule, Approved by EPA*, 19 Env't. Rep. (BNA) No. 52, at 2687-88 (April 28, 1989).

[305] "A State may prescribe and enforce, for purposes of motor vehicle emission control, a control or prohibition respecting the use of a fuel or fuel additive in a motor vehicle or motor vehicle engine if an applicable implementation plan for such State under section 7410 of this title so provides." 42 U.S.C. § 7545(c)(4)(C) (1989).

other fuel controls are "...necessary to achieve the national primary or secondary ambient air quality standard which the plan implements."[306] [Emphasis added].

How "necessary" does Reid Vapor Pressure regulation have to be, to qualify as "necessary to achieve" the NAAQS? In answer to this question, EPA borrowed reasoning it had already applied in an SIP revision in Maricopa County, Arizona. In a revision to its carbon monoxide SIP, Arizona had proposed an oxygenated fuels requirement. In its approval of the Maricopa County SIP revision, EPA reasoned an SIP fuel requirement can be "necessary" if it is "essential" to timely attainment of the NAAQS, and:

- No alternative strategies exist;
- Or, the alternative strategies which do exist are impracticable or unreasonable to implement.[307]

In practice, the second rationale is the one actually applied to justify fuel controls. Otherwise, any critic of fuel content regulation could point to "available", "poison-pill" alternative strategies such as driving restrictions, gas rationing and highway or plant shutdowns.

During the comment period, EPA was accused of allowing Massachusetts to implement its reduced RVP "simply because

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[306] 42 U.S.C. § 7545(c)(4)(C) (1989).

[307] Final Rule: Maricopa County, supra note 265, at 30,228; This SIP approval was eventually vacated, but on other grounds. Delaney v. USEPA, No. 88-7368, slip op. (9th Cir. March 1, 1990).

alternative measures are more inconvenient, unpopular, or costly." A specific criticism charged the state could have adopted a more comprehensive transportation control program.[308] In its response, EPA noted Massachusetts already had a very extensive set of transportation control measures.[309] The agency also recalled the vociferous popular and Congressional outcry EPA's own proposed transportation controls had raised in the 1970's.[310] EPA reiterated the relative inadequacy of the other alternatives to RVP regulation; then baldly stated the probable lack of public acceptance of a tougher transportation plan was a legitimate policy consideration in making its decision.[311]

Oil industry comments also attacked the accuracy of the emissions inventory and the modeling used by Massachusetts. EPA agreed the state's current emissions inventory was out-of-date, but the agency thought it <u>understated</u> the amount of VOC emissions. In EPA's opinion, the Massachusetts VOC problem was even worse than their modeling indicated. For

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[308] Final Rule: Mass., *supra* note 306, at 19,176.

[309] *Id.* at 19,177. The Massachusetts SIP included provisions to discourage single-passenger commuting, 40 C.F.R. § 52.1161; regulations encouraging use of bicycles, 40 C.F.R. § 52.1162; and an "almost unique" program freezing commercial parking space growth. 40 C.F.R. § 52.1134-35 (1989).

[310] Final Rule: Mass., *supra* note 304, at 19,177 (citing, H.R. REP. NO. 95-294, 95th Cong., 1st Sess.; reprinted in, 4 LEGISLATIVE HISTORY OF THE CLEAN AIR ACT AMENDMENTS OF 1977, at 2748-55 (1978)).

[311] Final Rule: Mass., *supra* note 304, at 19,175.

example, the 1987 inventory used had not counted running loss emissions.

The state's model predicted at least a 9000 tons per year [tpy], reduction in VOC emissions. This equaled about 5.1% of the total 1987 Massachusetts VOC inventory. EPA concluded the Commonwealth's VOC reduction forecast understated the plan's savings. Just as the inventory model had not accounted for running losses, the state's reduction modeling did not account for running losses, and the VOC emissions reductions lower RVP gasoline were expected to achieve with this type of emission.[312]

Alternative strategies considered by the state, included:

Massachusetts' Leading VOC Reduction Strategies

RVP 11.5 to 9.0 psi.....9,000 tons/year.....(5.1%)
Consumer/Commercial solvent restrictions.....7,400 tons/year.....(4.2%)*
Stage II controls.....6,200 tons/year.....(3.5%)*
Architectural coatings.....5,700 tons/year.....(3.2%)*

Percentage reductions from 1987 VOC inventory.
* Reductions for these area sources admittedly optimistic.

Figure 9

The combined reductions projected for minor control strategies, including an enhanced vehicle Inspection and Maintenance [I/M] program, was no more than 6%.[313]

Hopes for actually achieving the projected reductions

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[312] id. at 19,176.

[313] Proposed Rule: Mass., supra note 266, at 7796.

for solvents and architectural coatings were limited. As area sources, with innumerable commercial and private citizen users, they pose difficult enforcement problems. Anything even approaching 100% compliance would be difficult to attain.[314]

Between 1980 and 1987, Massachusetts had reduced its inventory of VOC's by 44%. To reach attainment, the Commonwealth needed to reduce VOC's by a further 28% from its 1987 inventory.[315] Even with a 9.0 psi gasoline program, the state would have about an 8% shortfall in its needed reductions, and would not reach attainment status. Some comments argued the reduced RVP standard could not be approved unless it was as part of an SIP revision which would bring the state into full compliance with the ozone NAAQS. In EPA's opinion:

> The fact that the state RVP regulation might not by itself fill the remaining shortfall and hence by itself achieve the standard does not mean the rule would not be 'necessary' to achieve the standard...[I]f Congress had intended EPA to approve a State fuel-content rule only if it were necessary and sufficient to achieve the standard, then it would have used that language...EPA believes that the 'necessary to achieve' standard must be interpreted to apply to measures which are needed to reduce ambient levels (thus bringing the area closer to achieving the NAAQS) when no other reasonable measures are available to achieve this reduction. A contrary application of 'necessary to achieve' in this situation would mean that measures which result in significantly improved air quality are nonetheless unacceptable (even though no other reasonable measures are available) just because they are insufficient to actually result in

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[314] id. at 7795-96.

[315] id. at 7796.

attainment.[316] [Emphasis added].

> It is simple logic that 'necessary' is not the same as 'sufficient'...Forcing a state to demonstrate attainment before allowing it to adopt stricter fuel controls would yield perverse results. Areas with the worst ozone nonattainment problems, which have the most difficulty assembling a demonstration of attainment, would be disable for perhaps for several years from adopting clearly necessary RVP controls stricter than national controls.[317]

Other comments raised the issue of cost as a factor in the agency evaluation of alternatives. EPA responded it is required to approve implementation plans which: will assist in attaining the standard,[318] have been approved after reasonable notice and public hearings, and which meet the other general requirements of 42 U.S.C. § 7410(a)(2).[319] "It is for the state to determine what economic costs are appropriate to achieve standards...EPA may not reject a state's SIP proposal simply for economic reasons."[320]

The cost issue was directly tied to the prospect of potential gasoline shortages, especially during the first

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[316] id. at 7796.

[317] Final Rule: Mass., supra note 306, at 19,174.

[318] 42 U.S.C. § 7410(a)(2)(B) (1989).

[319] Train v. Natural Resources Defense Council, Inc. 421 U.S. 60, 98 (1975); construing 42 U.S.C. § 7410(a)(3)(A) (1989), "The Administrator shall approve any revision of an implementation plan applicable to an air quality control region if he determines that it meets the requirements of...[42 U.S.C. § 7410(a)(2)]...and has been adopted by the State after reasonable notice and public hearings." [Emphasis added].

[320] EPA conceded cost impacts, along with other effects, are relevant in considering the "reasonableness" of suggested alternatives to fuel content regulation. Final Rule: Mass., supra note 304 at 19,177 (citing Union Electric Co. v. EPA 427 U.S. 246, 256-58, (1976)).

summer. EPA noted Massachusetts' reliance upon two NESCAUM sponsored studies predicting the 5% shortfall in gasoline supplies caused by butane removal could be readily made up through imports. The agency also noted Massachusetts had a waiver provision for refiner/importers who could not make up their supply shortfall. These factors satisfied EPA that cost impacts of the 9.0 psi limit would be "reasonable".[321]

The waiver provision was also a target of industry objection. BP Oil and Sun Oil objected to Massachusetts' plan to grant exemptions only to individual companies which were facing supply difficulties. The companies challenged the degree of discretion allowed to the Massachusetts DEP in its grant of waivers. Furthermore, a company obtaining a waiver could gain a competitive advantage as it could still distribute its stocks of cheaper high RVP gas, while complying companies could not. BP and Sun Oil urged waivers be industry-wide, if they were to be granted at all. As always, oil companies objected to Massachusetts' +1 psi allowance for 10% ethanol blends.

EPA reiterated it felt compelled to approve the SIP revision once its necessity had been established. It was approving the program as a whole, including its ethanol and supply shortage waivers. In passing, the agency noted little or no gasohol is actually sold in New England, and any recipient of a Massachusetts waiver would still be obliged to

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[321]Final Rule: Mass., supra note 304, at 13,178-79.

meet the new federal RVP limits.[322] As it turned out, no waivers were requested or granted in the summer of 1989.[323]

American Petroleum Institute challenged the validity of the Massachusetts rule because of the participation of the state's air Commissioner in the preparation and signing of the November 1987 NESCAUM Memorandum of Understanding. API argued adoption of a 9.0 RVP rule was a "predetermined" result of the state's public hearings. According to API, the Massachusetts rulemaking did not meet the Clean Air Act's prerequisite state SIP revisions follow "reasonable notice and public hearings."[324]

Generally, challenging the bias of a government official conducting administrative rulemaking is much more difficult than challenging the same official's bias as he adjudicates cases of individuals suspected of violating existing rules. Just like legislators making laws, rulemakers are expected to have opinions of their own. In this case, EPA noted API had not challenged the validity of the rulemaking process in either the state or federal courts, as they had done in New York State. The dates of notice and hearing complied with the standards of 40 C.F.R. § 51.102. Absent concrete

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[322] *id.* at 19,181-82.

[323] Telephone interview with Jim Neely, Division of Air Quality, Massachusetts Department of Environmental Protection (July 6, 1990).

[324] Final Rule: Mass., *supra* note 304, at 19,180 (quoting 42 U.S.C. 7410(a)(3)(A) (1989)).

evidence the hearing did not provide fair opportunity for public comment, the EPA would not "go behind" the record to determine the "reasonableness" of the state's procedures.[325]

Commenters expressed concern that, whatever the merits of Massachusetts' own RVP proposal, EPA approval would start the agency down a slippery slope where CAA § 211(c)(4)(A)'s federal preemption and goals of national uniformity would be swallowed by the CAA § 211(c)(4)(C) SIP revision exception. EPA responded states have a heavy burden of proof to qualify for an exception; and, "[A] state is unlikely to burden its citizens with the potentially higher cost of lower RVP fuel unless the air quality needs are compelling." The agency also felt NESCAUM's regional approach reduced the potential problem of a wide variety of state controls.[326]

For its first summer of operation, EPA set back the enforcement date of the Massachusetts regulation from 1 May to 30 June. Although some companies were on record as ready to comply with the 1 May start date found in the Massachusetts regulation, others were not. In the Massachusetts rulemaking, industry sources had indicated 60-70 days leadtime was required to get stocks down to 9.0 RVP. EPA gave considerable weight" to this estimate. The agency also felt it "...could not set an earlier effective date for

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[325]Final Rule: Mass., supra note 304, at 19,180-81.

[326]Id. at 19,177-78.

all suppliers based on the voluntary action of a few."[327] The 30 June start date came exactly 70 days after its 21 April decision date.

Bulk terminal records audited by MaDEP indicate average volatility was kept at 8.41 psi after June 30, though three terminals had individual tanks with exceedances ranging from 9.4 to 13.0 psi. In 1989, audits were not being used as a basis for enforcement actions. U.S. EPA tested eleven samples collected at Massachusetts service stations and found they not only met the federal 10.5 psi standard, but the state 9.0 psi limit as well. MaDEP conducted its own compliance testing at five of the state's fifteen terminals. Two samples were drawn from each of 27 tanks. Of the samples analyzed, only one exceeded the state limit, it tested 9.2 psi. MaDEP's potential enforcement action was frustrated, because, "...before the Department was able to consider [an enforcement] decision, the laboratory, without authorization from the Department, analyzed the backup sample." The second test yielded a result of 8.8 psi, "...thus confounding and forestalling an enforcement response. This particular event...called into question the value of drawing a second sample."[328]

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[327] *id.* at 19,182.

[328] "[H]aving a backup may be confusing with regard to enforcement, especially if one sample is in compliance and the other is not." Double sampling also increases the time and expense of each inspection while cutting the number of separate installations which can be inspected in one day.

No companies requested or received an enforcement waiver. Over the course of the summer, Massachusetts experienced summer price increases of 2-3 cents/gallon.[329]

In 1990, EPA approved a minor amendment to the SIP, giving the state flexibility to adopt new gasoline volatility standard test methods, without having to undertake a formal SIP revision.[330]

[2] Rhode Island

Rhode Island's version of the NESCAUM regulation[331] was submitted to EPA for approval November 10, 1988. The Environmental Protection Agency published its proposed approval of the rule, March 16, 1989. Although the agency was about to announce its own Phase I regulation, which did contain an explicit preemption provision, its analysis of preemption and the rest of the Rhode Island plan was nearly identical to what it had said about the Massachusetts plan.[332]

Using similar data to that employed in Massachusetts, including the lack of precise data for running losses, Rhode Island determined that despite its 17% reduction of VOC's

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MASS. PROGRAM REPORT, *supra* note 69, at 7, 12-15.

[329]Neely interview, *supra* note 323.

[330]Final Rule, *Approval and Promulgation of Air Quality Implementation Plans: Massachusetts Ozone Attainment Plan: Control of Gasoline Volatility*, 55 Fed. Reg. 14,331 (April 19, 1990).

[331]R.I. POLLUTION REG. § 11 (1989).

[332]Proposed Rule: R.I., *supra* note 266, at 11,018.

from 1980 to 1987, it needed to cut at least another 40% to reach attainment status. The state's leading VOC reduction options are described by Figure 12.[333]

Rhode Island's Leading VOC Reduction Strategies

Basic - Enhanced Inspection and Maintenance	5,014 tons/year	(5.1%)*
RVP 11.5 to 9.0 psi	2,456 tons/year	(2.5%)
Stage II Controls	1,600 tons/year	(1.6%)
Architectural coatings	334 tons/year	(.3%)**
Consumer solvents	280 tons/year	(.3%)**

Percentage reductions projected from 1986 inventory.
* Rhode Island did not have an EPA approved I/M program in 1989.
** A totally effective reduction of these area emissions was not expected to be achieved.

Figure 10

No minor category of RVP reduction was expected to reduce VOC's by more than .3%. Rhode Island expected to be left with a shortfall of about 18% in its needed reductions.[334]

[3] Connecticut

Connecticut's SIP revision was submitted to EPA on January 30, 1989, and proposed for approval by EPA on March 16, 1989.[335] Since the Phase I regulations were not yet promulgated, EPA engaged in a discussion identical to that used with the Massachusetts and Rhode Island proposals in analyzing its authority to approve a nonattainment SIP and

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[333] *id.* at 11,019.

[334] *id.* at 11,019.

[335] Proposed Rule: Conn., *supra* note 267. The state regulation is found at, CONN. AGENCIES REGS. 22a-174-20(a) (1989).

the relative degree of "necessity" needed for fuel-content regulation.[336]

Connecticut had reduced VOC emissions by 37% since 1980, but was thought to need another 37% reduction to reach ozone attainment. As with its sister New England states, Connecticut's analysis was conducted omitting the running loss factor from the calculation of both its VOC emissions inventory and projected VOC emission reductions. It was thought improved I/M might attain a further 2% VOC reduction, and a combination of minor programs might secure another 2% reduction. This put the burden on the state's major alternative strategies:[337]

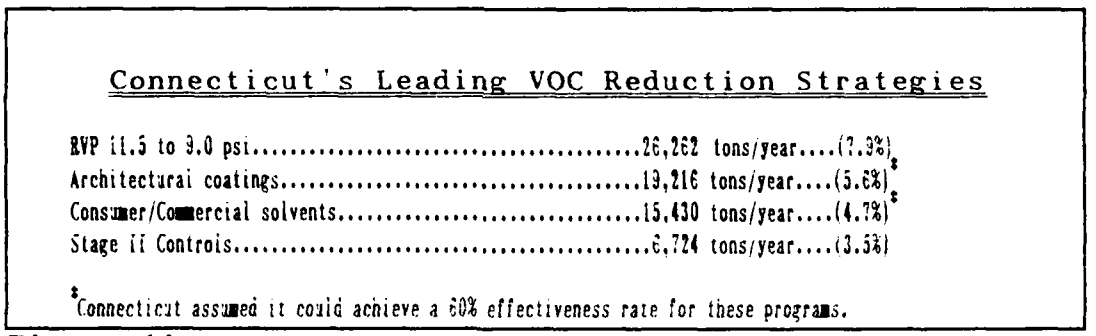

Figure 11

Even if all the leading and minor strategies were applied, Connecticut would still be left with a shortfall of 13% in needed reductions.

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[336]Proposed Rule: Conn., *supra* note 267, at 11,016-17.

[337]*id.* at 11,017.

[4] EPA Approves the Connecticut and Rhode Island Plans

EPA approved both the Connecticut and the Rhode Island SIP revisions on the same date, May 10, 1989.[338] With the addition of three new twists, the issues raised during the comment period and the agency's analysis of them were virtually identical to those in the Massachusetts SIP revision.[339]

American Petroleum Institute suggested the two states would be in attainment, but for transport of ozone and ozone precursors from upwind states. According to API: 1) Reducing the RVP of gasoline sold in either state would have little or no impact in helping them reach attainment. 2) Since RVP reduction could not help them reach attainment, the Connecticut and Rhode Island SIP revisions could not be determined to be "helpful," let alone "necessary," to the attainment of the ozone standard.[340] 3) Since the RVP reductions were not "necessary", they could not be approved.[341]

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[338]*Connecticut, Rhode Island, Fuel Rules Approved*, 20 Env't. Rep. (BNA) No. 3, at 164 (May 19, 1989).

[339]Final Rule, *Connecticut and Rhode Island Ozone Attainment Plans; Control of Gasoline Volatility*, 54 Fed. Reg. 23,650 (June 2, 1989)[hereinafter Final Rule: Conn./R.I.]. Minor, technical corrections to Connecticut's SIP, including definitions and testing provisions relevant to the gasoline RVP program have been proposed for approval by EPA: Proposed Rule, *Approval and Promulgation of Air Quality Improvement Plans; Connecticut; Revised Regulations Controlling Volatile Organic Compound Emissions*, 55 Fed. Reg. 20,614 (May 18, 1990).

[340]Final Rule: Conn./R.I., supra note 339, at 23,654.

[341]42 U.S.C. § 7545(c)(4)(C) (1989).

The Environmental Protection Agency conceded, "It may be true that measures taken in Connecticut or Rhode Island will have little measurable impact within their borders. This is largely because these states are comparatively small."[342] EPA responded to API's argument by analyzing the problem from the perspective of the states downwind (northeast) from Rhode Island and Connecticut. According to EPA, the agency has "consistently" been allowed to consider impacts of upwind areas on downwind areas in its nonattainment plan revisions.[343]

American Petroleum Institute also introduced a new wrinkle to the preemption argument. API noted the Connecticut and Rhode Island enforcement plans called for sampling at terminals, bulk plants and other primary distribution points, but not at the retail level. API argued the federal scheme, which included testing and enforcement at the retail level, set a minimum enforcement standard which the states were required to match. EPA responded the enforcement problems of the national Phase I program, with its 3 different RVP levels did not match those of Connecticut and Rhode Island. The agency thought it unlikely Connecticut or Rhode Island retailers would go to the trouble and expense of trucking-in high RVP gasoline from distant out-of-state

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[342]Final Rule: Conn./R.I., supra note 339, at 23.654.

[343]Id. at 23.654 (citing State of Ohio v. Ruckleshaus, 776 F.2d 1333 (6th Cir. 1985), cert. den. sub. nom. Ohio v. Thomas, 476 U.S. 1169 (1986)); *and see* 42 U.S.C. §§ 7410 (a)(2)(E)(ii) and 7426 (1989), relating to interstate pollution abatement.

locations. In addition, the two states would have access to the results of EPA's testing of their retailers in its enforcement of the national RVP program. If a problem did become evident, the state plans could be adjusted at that time.[344]

The agency also rejected an API argument the states' SIP revisions were inadequate because they did not require record keeping. The agency noted the national program only recommended, and did not require record keeping, [except for ethanol blenders].[345]

In determining the first year program initiation date for Connecticut and Rhode Island, EPA noted its prior approval of the Massachusetts plan. It noted Connecticut and Rhode Island shared many links in a gasoline distribution system which presumably was already gearing-up to meet the Massachusetts standard. The agency then set 30 June as their compliance date as well.[346]

In its first summer, the Connecticut inspection and testing program did not get off the ground. Despite a starting date pushed back two months after the 1 May date it had intended, Connecticut found itself with untrained inspectors and improperly functioning test equipment. Although they had no authority to inspect retailers

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[344]Final Rule: Conn./R.I., supra note 339, at 23,657.

[345]*id.*

[346]*id.* at 23,659-60.

themselves, Connecticut inspectors did informally accompany EPA inspectors on their inspections at ten service stations. The samples drawn and tested by EPA all met the 9.0 psi state standard.[347]

Rhode Island did not receive its test equipment until the 1989 regulatory period was over. A Department of Environmental Management review of summer 1989 industry records suggested there may have been two exceedances during the 30 June-15 September time period, but no action was pursued by the state. (The private company test method was prone to error and did not match the state enforcement protocol).[348]

In 1990, Rhode Island has been sampling about once a week. It has been testing one tank at each bulk plant and terminal, but may conduct comprehensive tank-by-tank testing later in the summer. To date (July 9, 1990) the only two exceedances found during 1990 were found May 8, just one week after the enforcement period started. In each case, notices of violation were issued and civil penalties assessed. The state's inspector is concerned that rather than reblend their high RVP fuel, some distributors may simply ship it as fast as possible to retailers, who are not currently subject to

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[347]Telephone interview with Phil Florkoski, Connecticut Bureau of Air Management (July 6, 1990).

[348]Telephone interview with Karen Slattery, Division of Air and Hazardous Materials, Rhode Island Department of Environmental Management (July 9, 1990).

the state's inspections.[349]

[5] New Jersey

The New Jersey Department of Environmental Protection [NJDEP] concluded the comment period for its proposed 9.0 psi Reid Vapor Pressure rules October 7, 1988. Comments included the usual concerns: higher prices, gasoline shortages, poor starts and vehicle performance during the spring transition period, and possible safety and repair problems.[350]

New Jersey is a much larger consumer market than the individual New England states. In 1987, the state's 4000 service stations dispensed 3.6 billion gallons of gasoline. In addition to the sheer size of its market, one special consideration may have been operable during New Jersey's rulemaking. Unlike the other NESCAUM member states, New Jersey has a major importing and refining industry of its own. About 60% of the gasoline sold in New York and New England is shipped through New Jersey.[351]

Although the risk of injuring a major state industry might seem likely to discourage New Jersey rulemakers, the state's position in the gasoline market may have actually encouraged NJDEP's adoption of the 9.0 psi limit. Since New Jersey is geographically located at the "tap" supplying most

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[349] *id.*

[350] *New Jersey Nears Final Action on Rule to Require Reduced Gasoline Volatility*, 21 Env't. Rep. (BNA) No. 25, at 1226-27 (October 21, 1987).

[351] *id.* at 1227.

of the northeast's gasoline, NJDEP could safely assume New Jersey would be better able to adjust to any supply problems caused by reducing RVP than could any other NESCAUM state. NJDEP could also have the satisfaction of knowing its adoption of a 9.0 limit would probably lead to the marketing of 9.0 gasoline throughout large areas of the Northeast, whether or not those states were members of NESCAUM or had themselves adopted a 9.0 psi limit. A major share of the extra costs associated with 9.0 gasoline would be borne by consumers outside the state's borders, while at least some members of its refining industry might actually make higher gross profit.

New Jersey adopted its 9.0 psi RVP regulation[352] January 27, 1989, and submitted it to EPA as an SIP revision the same day. To attain the ozone standard just in its portion of the New Jersey/New York/Connecticut Air Quality Control Region, New Jersey had estimated it needed a 59%, 252,800 ton reduction from the AQCR's 1980 VOC annual emission inventory. (As in the other states, running losses were not factored into the calculations). As EPA began consideration of the SIP revision, New Jersey was credited with having already attained a 39.8% reduction. This left a reduction shortfall of 82,330 tons per year. New Jersey assessed its options in

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[352] N.J. ADMIN. CODE tit. 7, § 27, subch. 25 (1989).

the following manner:[353]

New Jersey's Leading VOC Reduction Strategies for New Jersey Portion, Metro New York AQCR

Reducing RVP from 11.5 to 9.0	13,400 tons/year	(5.2%)*
Architectural coating	9,650 tons/year	(3.7%)*
Lowered exclusion rates	20,100 tons/year	(7.8%)
Barge/tanker loading controls	3,900 tons/year	(1.5%)**
Additional Consumer/Commercial solvent controls	6,030 tons/year	(2.3%)*
Automobile refinishing controls	3,020 tons/year	(1.2%)*
Enhanced I/M program	10,600 tons/year	(4.1%)

* Percentage reductions from 1987 VOC inventory.
* Table assumes 100% effectiveness, New Jersey experience suggests 20% more likely to be achievable.
** Program to be delayed at least two years due to U.S. Coast Guard safety study.

Figure 12

Even under its most optimistic calculations, adopting all suggested strategies, New Jersey still had a 5.5% emission reduction shortfall. Nonetheless, RVP regulation did promise significant reductions. In addition to the 13,400 tpy VOC reduction it projected for its portion of the New Jersey/New York/Connecticut Air Quality Control Region, New Jersey forecast its RVP reduction would produce an additional 11,400 tpy VOC reduction in the remainder of the state. This projected total of 24,800 tons per year was equivalent to only about 8% of its annual VOC emissions inventory, but represented 19% of its summer ozone season inventory of VOC's. NJDEP also determined the difference between a 9.0 and 10.5 psi standard. The state calculated a 9.0 psi level would prevent emission of 5,896 more tons of

[353]Proposed Rule: New Jersey, *supra* note 136, at 12.655.

VOC's per year more than the EPA's 10.5 limit.[354]

EPA announced its approval of New Jersey's 9.0 RVP standard June 7, 1989.[355] EPA responded to the various objections raised by the oil industry in a manner identical to that employed in its promulgation of the Massachusetts proposal.[356]

Although its decision left the official leadtime at barely three weeks, EPA again set June 30 as the first year enforcement date. The agency noted Colonial Pipeline had been shipping only 9.0 psi gasoline since March 1, 1989. The industry had already been adjusting to meet the federal 10.5 limit since its promulgation in March. Other adjustments had been made to meet the previously approved Massachusetts, Rhode Island and Connecticut plans. Because New Jersey and these states shared so many links in the gasoline distribution network, EPA felt no compunction in authorizing a June 30 enforcement date.[357]

New Jersey conducted a vigorous enforcement program in 1989. NJDEP conducted 139 separate records examinations. It also conducted 109 separate on-site facility inspections.

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[354] *id.*.

[355] *Fuel Volatility Rules Approved for N.J.,N.Y.*, 20 Env't. Rep. (BNA) No. 8, at 480 (June 23, 1989).

[356] Final Rule, *Approval and Promulgation of Implementation Plans; Revision to the State of New Jersey Implementation Plan for Ozone*, 54 Fed. Reg. 25,572 (June 16, 1989).

[357] *id.* at 25,580.

During the on-site inspections, NJDEP drew 548 samples from 274 sources. (Two samples are drawn from each source, both must be found to exceed the standard for a notice of violation to be issued). The lab used by the state had some problems with "repeatability" in its testing of the state's samples, nonetheless, 27 of the sources were found to contain gasoline exceeding the state's +9.3 psi RVP. Their facilities received notices of violation and civil penalties. Sixty-five additional citations were issued to facilities failing to keep required records or having inaccurate records.[358]

Sampling to the midpoint of the 1990 enforcement period, (1 May-15 September), has detected the same 10% violation rate experienced in 1989. Contrary to prediction and to experience in other programs, violations have been spread throughout the enforcement period and not concentrated in the May transition period. Companies relying on domestic suppliers have the best compliance record; companies dependent on overseas sources (especially certain European refineries) have been repeat offenders throughout both summers.[359]

New Jersey's position as entry point for much of the gasoline consumed in the Northeast probably did work to its

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[358]Telephone interview with David Volz, Enforcement Division, New Jersey Department of Environmental Quality (July 9, 1990).

[359]*id.*

advantage. Despite the dire predictions of the oil industry, New Jersey did not experience shortages or shortage related price increases in 1989. NJDEP did not receive a single request for an enforcement waiver during the summer of 1989.[360]

[6] New York

EPA received the New York regulation[361] on February 6, 1989 along with the state's request that it be approved as an SIP revision.

Discussion of the New York proposal focused on the state's one, abiding, intractable ozone nonattainment problem area, the New York City Metropolitan Area [NYCMA]. The 1984 SIP for the New York portion of the tri-state AQCR estimated reaching attainment status would require yearly VOC emission reductions of 199,676 tons per year (-59% from 1982 emission levels). In EPA's estimation, by 1989 the state had only achieved a 38.1% reduction, leaving 70,938 tpy remaining to be reduced. New York modeled its options as follows:

New York's Leading VOC Reduction Strategies for NYCMA

Reduce RVP from 11.5 to 9.0 psi	3,004 tons/year	(4.3%)
Architectural Coatings/Commercial Consumer Solvents/Auto Refinishing	4,300 tons/year	(2.1%)
RACT for small sources	3,978 tons/year	(1.3%)
Perc dry cleaners	3,347 tons/year	(1.3%)

Percentage reductions from 1987 VOC inventory.

Figure 13

Development of an improved I/M program might reduce

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[360] id.

[361] N.Y. COMP. CODES R. & REGS., tit. 6, § 225-3 (1989).

emissions by something less than 5,000 tons (2.5%) per year. A combination of various minor strategies were thought to be able to reduce VOC's a further 1.5%. Even with these reductions, New York City would still have a 22.1% shortfall in its needed VOC reductions.[362] Despite its limitations, a 9.0 psi gasoline limit was thought likely to reduce the New York City VOC inventory by as much as 30% on a hot day.[363] Of the projected 9004 annual ton reduction in VOC emissions credited to the switch to 9.0 psi gasoline, NYSDEC estimated 3800 tons could be attributed to the state's jump to 9.0 psi from the federal 10.5 psi limit.[364]

In one respect, New York was different from New Jersey, Connecticut, Rhode Island, and Massachusetts. Every township, city, and county in those states was nonattainment for ozone. In New York, until the summer of 1988, only upstate Jefferson County, and the counties within the New York City Metropolitan Area were listed as nonattainment for ozone.[365] This left 6,751,681 New York State residents

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[362]Proposed Rule, *Approval and Promulgation of Implementation Plans; Revision to the State of New York Implementation Plan for Ozone*, 54 Fed. Reg. 12,656. 12,658 (March 28, 1989)[hereinafter Proposed Rule: New York].

[363]HEARING REPORT, PROPOSED ADOPTION OF A NEW AIR POLLUTION CONTROL REGULATION: 6 NYCRR Subpart 225-3 "*Fuel Consumption and Use--Motor Fuel*", New York State Department of Environmental Conservation at 4 (August 30, 1988).

[364]Proposed Rule: New York, *supra* note 362, at 12,658.

[365]Located at the eastern end of Lake Ontario, Jefferson County's principal city is Watertown. Estimated population for the county in 1986 was 88,151. Jefferson County is a part

residing outside any officially listed ozone nonattainment area.

The "fortuitously" hot summer of 1988 and a cooperative attitude at U.S. EPA helped insure approval of a 9.0 psi SIP revision extending to the entire state. Although analysis of monitoring data was incomplete, it appeared summer 1988 one hour exceedances would place nine additional New York counties, in nonattainment status for ozone.[366] New York projected upstate 9.0 RVP related reductions in VOC's of 26,500 tons per year. In its submission, NYSDEC expressed its belief a 9.0 RVP might be the only means to reach attainment in some upstate counties. The state had not had time to develop emissions inventories and conduct modeling for these areas, but it also argued a statewide 9.0 psi RVP would probably, by itself, be sufficient to bring most of

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of the Central New York Intrastate AQCR. EPA's "SIP call" for Jefferson county had only been issued in May 1988. The New York portion of the NYCMA consists of the following counties: Richmond (Staten Island), New York (Manhattan), Bronx, Kings (Brooklyn), Queens, Nassau and Suffolk (Long Island), Rockland and Westchester; (total population in 1986, 10,802,972). EPA had also required the two attainment counties adjoining the NYCMA to the north (Orange and Putnam, population 336,796) to be included in NYCMA SIP Revisions due to their "upwind" contributions of ozone and ozone precursors to the NYCMA. *id.*

[366]The projected new listings expected from the three year 1986-88 computations included, Erie [Buffalo] and Niagara counties in western New York; (combined population, 1,242,573). In the greater Albany area and upper Hudson River valley, potential new nonattainment areas included: Albany, Schenectady, Saratoga, Rensselaer, Washington and Essex counties; (total population, 832,551). Dutchess county, population 245,055,on the east bank of the Hudson just north of Putnam county was the other new "problem" county. *id.*

these counties into attainment status. RVP regulation would avoid the delays entailed in development and implementation of an I/M program, Stage II vapor recovery controls, consumer solvent regulation or imposing additional controls on stationary sources.[367]

The Environmental Protection Agency took a tortured approach in its determination a statewide 9.0 psi limit was "necessary to achieve" New York's attainment objective:

> In light of the State's submitted analysis and the fact that New York does not currently have a nonattainment demonstration for the upstate nonattainment counties listed above, EPA cannot now conclude that the RVP program is not necessary to achieve the standard as expeditiously as practicable in those areas. Until EPA is in a position to conclude that the program is definitely not necessary, the Agency believes it is appropriate to make a finding under section 211(c)(4)(C) with respect to the RVP program in the upstate nonattainment areas...Further, it appears that since the upstate nonattainment areas are located geographically all over the State, New York logistically had to make the RVP rule apply on a statewide basis in order to ensure compliance in the nonattainment areas with out producing supply and distribution problems. Given New York's need to apply the RVP program statewide, EPA finds that application of the program throughout the State is necessary to achieve the ozone standard as expeditiously as practicable in all of the upstate and downstate nonattainment areas.[368] [Emphasis added].

In other words, the absence of proof 9.0 RVP controls were unnecessary, satisfied EPA it had sufficient evidence to make its statutorily required finding such controls were indeed "necessary".

In its final approval of the SIP, EPA addressed comments

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[367] *id.*

[368] *id.* at 12,053.

similar to those which had been raised in Connecticut and Rhode Island concerning the "transport" aspect of SIP VOC reductions. The agency provided additional justification for imposing 9.0 psi limits in upstate attainment areas:

> What is generally known about ozone formation suggests that emissions from upstate New York may contribute to ozone formation in western New England, an area that has experienced ozone standard violations. This suggests controlling upstate New York emissions may well be necessary for timely attainment in parts of New England.[369]

EPA's Final Rule for New York disposed of the same issues, in the same manner, as raised in the other NESCAUM states. In the same fashion, the 1989 start date was set at June 30, to be replaced by 1 May in the subsequent years of the program.[370]

Pursuant to its settlement agreement in *American Petroleum Institute v. Jorling*, New York's 1989 enforcement effort was restricted to its eastern counties. Inspections began July 10, 1989. About two-thirds of the bulk terminals in the eastern portion of the state were subjected to inspection in 1989. Among 51 samples, four exceeded 9.0 psi RVP; but only one was found to exceed the settlement's 1989 enforcement tolerance of +.40 psi. Drawn 14 July, that sample tested at only 9.45 psi. Considering the *de minimis* nature of the violation and its proximity to the start of the

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[369]Final Rule, *Approval and Promulgation of Implementation Plans; Revision to the State of New York Implementation Plan for Ozone*, 54 Fed. Reg. 26,030, 26,033 (June 21, 1989).

[370]*id.* at 26,030.

1989 enforcement season, NYSDEC chose not to pursue civil penalties. Of six samples drawn in western New York, (which was excluded from enforcement in 1989), three had Reid Vapor Pressures under 9.0 and three exceeded it, but all were under EPA's enforceable 10.5 psi standard.[371]

[7] Maine

Maine issued its 9.0 regulation[372] on August 10, 1988, to take effect the next summer.[373] The regulation was first submitted to EPA as an SIP revision, February 14, 1989. On May 3, 1989, after EPA request, the initial submission was revised in part an supplemented with additional VOC inventory data. Having arrived so late, EPA did not publish the proposed revision until after the summer, 1989 ozone season was almost over.[374]

Maine was in a position somewhat analogous to New York. All or parts of 12 of its 16 counties were designated nonattainment for ozone. The portions of the state located inland and outside the lower Kennebec and Penobscot River

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[371]New York State Department of Environmental Conservation, *RVP Status Report*, with computer printout *RVP Inspections* (undated).

[372]1988 Me. Reg. § 119.

[373]*State Board Adopts Regulations to Reduce Gasoline Volatility in Summer to Control Ozone*, 19 Env't. Rep. (BNA) No. 16, at 705 (August 19, 1988).

[374]Proposed Rule, Approval and Promulgation of *Implementation Plans: Maine Ozone Attainment Plan: control of Gasoline Volatility*, 54 Fed. Reg. 37,479 (September 11, 1989)[hereinafter Propose Rule: Maine].

valleys are in attainment status.[375] Unlike New York, Maine is less a generator than it is a recipient of ozone and ozone precursors. The state lies at the downwind, receiving end of the Northeast's ozone transport problem.[376]

Of the ozone and ozone precursors which are generated within the state, 95% are attributed to area sources, which include automobiles. About 79% of those area source emissions originate in the state's nonattainment areas.[377]

Maine had a 1986 VOC emissions inventory calculated at 121,126 tons per year. Modeling suggested a 25% VOC reduction was necessary for the state to reach attainment. Because of its rural nature and dispersed traffic patterns, both EPA and MeDEP ruled out a transportation plan as impractical. Nonetheless, because Maine was just starting to address its ozone nonattainment problems, its list of alternative strategies was much more extensive than those listed for the other NESCAUM states. It is instructive to find RVP controls are the one strategy for which Maine expects to reach 100% compliance.[378]

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[375] *Id.* at 37,481.

[376] In the words of Ron Severance, Maine Department of Environmental Protection, "It's as if we are sitting at the end of somebody else's exhaust pipe." Telephone interview (July 6, 1990).

[377] Proposed Rule: Maine, *supra* note 374, at 37,481.

[378] *Id.*

Maine's Leading VOC Reduction Strategies

Strategy	Tons Reduced		Est. Control	Percent Reduction
Enhanced I/M - Basic I/M	7,238	tons/year	N/A	6.0%
Stage II Controls	2,730	tons/year	70%	2.2%
Stage I Controls (gas stations)	2,508	tons/year	85%	2.1%
Consumer/commercial solvents	2,244	tons/year	60%	1.9%
RVP 11.5 to EPA 10.5 limit	2,175	tons/year	100%	1.8%
Miscellaneous surface coating	1,850	tons/year	50%	1.5%
Architectural coatings	1,636	tons/year	70%	1.4%
RVP 10.5 to State 9.0 limit	1,575	tons/year	100%	1.3%
Paper coating	1,559	tons/year	70%	1.3%
Bulk terminal controls	753	tons/year	85%	.6%
Auto body	650	tons/year	50%	.5%
Degreasing	650	tons/year	50%	.5%
Printing	490	tons/year	70%	.4%
Drycleaning	330	tons/year	30%	.3%
Industrial solvents	350	tons/year	50%	.3%
Furniture coatings	210	tons/year	70%	.2%
Tank truck tightness	250	tons/year	30%	.2%
Printing (non RACT)	159	tons/year	50%	.1%
Fabricated metal coating	140	tons/year	70%	.1%
Traffic paint	90	tons/year	30%	.1%

Figure 14

Just as did New York, Maine requested its nonattainment SIP revision be approved for implementation statewide. In addition to a desire to maximize the reduction of VOC's, Maine had to consider the practical limits of simultaneously marketing two different RVP gasolines in a state with only 1,182,000 inhabitants. Two separate standards would also pose enforcement problems. With the state's inspection and sanction authority directed at bulk plants and terminals which are generally located in the coastal nonattainment areas; MeDEP could not efficiently insure high RVP gasolines found at those terminals would only be distributed to retailers located in inland attainment areas.

Maine submitted its corrected SIP Revision too late to get EPA authorization to implement its 9.0 psi RVP limit in 1989. Only two of its bulk terminals agreed to voluntarily meet the 9.0 standard. Nonetheless, for the most part, Maine consumers were using 9.0 gasoline throughout the summer of 1989. Many of Maine's eleven bulk terminals serve not just Maine, but other New England states. Companies serving Maine had to comply with 9.0 limits in their southern New England markets. MeDEP obtained voluntary reports from its bulk terminals and also had access to the results of EPA's federal program inspections. About 75% of the 316 shipments of gasoline received at Maine's terminals from May to September 15 were 9.0 psi RVP or less.[379] The state also underwent the same 2-3 cent/gallon price increase attributed to the widespread presence of 9.0 gasoline which had been experienced in Massachusetts.[380]

[8] The Other NESCAUM States

For political reasons, New Hampshire has neither undertaken rulemaking, nor promulgated a 9.0 RVP regulation.[381] Vermont did promulgate a 9.0 psi regulation, which became

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[379]MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION, BUREAU OF AIR QUALITY CONTROL, GASOLINE VOLATILITY STANDARD REPORT 3 (February 1, 1990).

[380]Severance interview, supra note 378.

[381]Seidman interview, supra note 238.

final, January 13, 1989.[382] Unlike the other NESCAUM states, the entire state of Vermont is "attainment" for ozone. Since it is in attainment, EPA's explicit preemption of state volatility rules in its Phase I announcement,[383] left Vermont no legal basis for enforcement of its own regulation and without a legal justification for an SIP revision.

Without an enforceable program of its own, in 1989 Vermont could not conduct its own inspection program. The state did review shipping manifests voluntarily supplied by its suppliers. The manifests indicate the state received 9.0 psi gasoline throughout the summer of 1989.[384] Just as Maine discovered, the omission of Vermont and New Hampshire from the 9.0 regulatory scheme has not really compromised the NESCAUM plan. Once New York and southern New England met the standards of the MOU, geography and the economics of bulk gasoline distribution have virtually insured their service stations receive 9.0 psi gasoline.[385]

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[382]*Most Northeast States to Have Final Rules on Fuel Volatility Before 1989 Ozone Season*, 19 Env't. Rep. (BNA) No. 37, at 1835 (January 13, 1989).

[383]Final Rulemaking-Phase I, supra note 56, at 11,882.

[384]Telephone interview with Chris Jones, Vermont Division of Air Pollution Control (July 9, 1990).

[385]Only one bulk terminal lies within the boundaries of Vermont. The state receives most of its gasoline from terminals in New York, Connecticut and Massachusetts. *id.*

D. Pennsylvania Tries to Follow NESCAUM

At the suggestion of Delaware's governor, Michael M. Castle, air officials from West Virginia, Virginia, the District of Columbia, Maryland, Pennsylvania, Philadelphia and New Jersey met October 7, 1988 to consider forming an organization similar to NESCAUM. The Maryland representative justified the meeting by contrasting the demands EPA's Nonattainment Plan requirements were imposing on states with EPA "inaction" on volatility and stationary source controls. At the very first meeting, Pennsylvania recommended the jurisdictions take measures to reduce gasoline volatility.[386]

On October 15, 1988, the Environmental Quality Board within Pennsylvania's Department of Environmental Resources [PaDER] published proposed regulations for a summer 9.0 RVP standard, beginning with 1 May-15 September 1990. The PaDER promoted the proposal as one means of attacking the state's ozone problem (53 of 67 counties were nonattainment). PaDER used a cost-to-consumer estimate of 3 cents/gallon.

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[386]George Ferreri, Director, Maryland Air Management Administration, *quoted in, Middle Atlantic Group Trying to Solve Ozone Formation Problem, Official Says*, 19 Env't. Rep. (BNA) No. 27, at 1281 (November 4, 1988). Organizational efforts finally led to the formation of the Mid-Atlantic Regional Air Management Association [MARAMA] on February 26, 1990. Member governments included Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, Virginia, the District of Columbia, Philadelphia, and Allegheny County (Pittsburgh). In its first announcement, a representative stated all the member states except North Carolina would be adopting low volatility requirements for summer gasoline. *Mid-Atlantic States Sign Pact to Control Regional Air Pollution*, 20 Env't. Rep. (BNA) No. 44, at 1818 (March 2, 1990).

These regulations were disapproved by the state's Independent Regulatory Review Commission.[387] In 1859, with the drilling of Colonel Edwin Drake's first oil well, Titusville, Pennsylvania became the birthplace of the petroleum industry. Although 75% of the Commonwealth's petroleum supply now originates outside the state, its companies are still active participants in all phases of the oil business: production, refining and marketing. The IRRC's disapproval was tied to two concerns:

- Fear the short time lapse between publication of the regulations and their enforcement the next summer, would leave suppliers unable to comply, creating a gasoline shortage and/or price increases;
- Fear the eight Pennsylvania refineries (and their 8500 employees) would be at a competitive disadvantage if they were required to meet a 9.0 standard by 1990, while refiners in other states were expected to have at least until 1992 to meet the similar federal Phase II standard which was

[387]The IRRC consisted of five commissioners: one appointed by the Governor, one by the President pro tempore of the state Senate, one by the Speaker of the state House of Representatives, and one each by the minority leaders of the state House and Senate: as described in, Commonwealth Department of Environmental Resources v. Jubelirer, 567 A.2d 741, 745-46 (Pa. Commw. Ct. 1989).

pending promulgation.[388]

The IRRC's reversal of the regulation led to hearings where these arguments were repeated by the state's oil companies and their supporters. Arthur A. Davis, the Commonwealth's Secretary of Environmental Resources and representatives of local and regional environmental groups described the key role RVP reduction was intended to play in the state's pending Ozone Nonattainment SIP revision. Secretary Davis emphasized the potential sanction of federal funding cutoffs if an acceptable ozone reduction plan was not produced by the state.[389]

Alleging failures by both federal and state governments, a citizen's group in the Philadelphia area had just initiated a suit attempting to block $100,000,000 in federal highway and environmental grants to the state.[390] Despite his entreaties, the state Senate rejected the regulation by a 39-10 vote on 12 April, a month after EPA had announced its national Phase I standards. Since disapproval by either

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[388]Memorandum from Senator Michael D. Fisher, Chairman, to Members Environmental Resources and Energy Committee, Pennsylvania Senate, *Subject: Public Hearing on Regulatory Review Report No. 1--Proposed Gasoline volatility Regulations*, 1-3 (February 16, 1989).

[389]*Health Risks, Threat of Funding Cutoff Justify Fuel Volatility Control, DER Head Says*, 19 Env't. Rep. (BNA) No. 47, at 2526 (March 24, 1989).

[390]Delaware Citizen's Council for Clean Air v. Arthur Davis, No. 89-2592 (E.D. Pa. filed April 11, 1989).

house of the legislature could kill the proposed regulation, Pennsylvania's House of Representatives did not vote on the measure.[331]

Since it was not able to push through its own 9.0 psi plan, the Department of Environmental Resources turned to the federal government. On April 26, with the direct participation of Governor Casey, PaDER petitioned the Environmental Protection Agency to reconsider its Phase I regulation. The Governor accused EPA of:

> ...fail[ing] to adequately address the urgent need for more significant reductions in ozone in the Northeast...EPA perpetuates the problem of existing onboard automobile control systems that do not match the gasoline that is available...EPA underestimates the importance of reducing gas volatility to RVP 9.0 to successfully reduce ozone pollution. EPA's continuing delay in adopting appropriate gasoline volatility requirements is the major factor in causing serious ozone problems in Pennsylvania.[332] [Emphasis added].

After EPA's denial of the petition, Pennsylvania sued EPA in the U.S. Court of Appeals for the District of Columbia. In view of the failure of his own legislature to adopt 9.0 RVP regulation, Governor's finger pointing seems misdirected. Perhaps his administration thought so too: it sued the state Senate in August. Not surprisingly, PaDER raised "Legislative Veto" and Separation of Powers arguments:

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[331] *Proposed Rule on Gasoline Volatility Killed by Senate After Rejection by Panel*, 19 Env't. Rep. (BNA) No. 51, at 2634-35 (21 April 1989).

[332] *Pennsylvania Asks EPA to Consider Stricter Rule on Gasoline Volatility*, 20 ENV'T. REP. (BNA) No. 1, at 15-16 (May 5, 1989).

> The Senate action barred publication of these critical regulations through a resolution that was not passed by both houses of the General Assembly and was not presented to the governor for action as required under Pennsylvania's Constitution...[T]he action of the Senate and IRRC violate the separation of powers doctrine by unduly interfering with the duties of the executive branch through a burdensome and intrusive legislative review process.[333]

In December, the Commonwealth Court ruled 3-2, the Regulatory Review Act did indeed violate the state constitutional doctrine of separation of powers, (and possibly its bicameralism requirement, as well) and it ordered publication of the proposed regulations.[334] That order was then immediately suspended pending action by the state Supreme Court on the Senate's appeal.[335]

The EPA suit was settled, January 6, 1990. In exchange for a stay in the suit, EPA promised Pennsylvania, (plus Connecticut, Massachusetts, New Hampshire and New York which had joined), that it would issue its Phase II regulations by

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[333]Keith Welks, Chief Counsel, Pennsylvania Department of Environmental Resources, as *quoted in, Pennsylvania Sues State Senate, EPA Over Gasoline Volatility Regulations*, 20 Env't. Rep. (BNA) No. 18, at 744 (September 1, 1989).

[334]The Commonwealth Court made extensive analogies to the Supreme Court's interpretation of the United States Constitution in Immigration and Naturalization Service v. Chadha, 462 U.S. 919, 930 (1983); Commonwealth Department of Environmental Resources v. Jubelirer, 567 A.2d 741, 748-49 (Pa. Commw. Ct. 1989).

[335]Pennsylvania Department of Environmental Resources v. Jubelirer, No. 65 (M.D. Pa. December 10, 1989).

June 1, 1990.[336]

E. SIP Revision in Maryland

The Environmental Protection Agency issued the state of Maryland a "SIP call" for ozone on May 26, 1988. After conducting hearings in early August 1989, the Maryland Department of the Environment [MDE] adopted a 9.0 psi regulation[337] on October 4, and submitted it to EPA on October 30, 1989. EPA announced its proposed approval in May 1990.[338]

Maryland's ozone nonattainment problems lie in the Metropolitan Baltimore AQCR and in the state's portion of the National Capital AQCR. In its 1982 SIP, Maryland had estimated the two AQCR's needed VOC emission inventory reductions of 48% (215 tons per day [tpd]) and 46% (93 tpd) respectively if they were to reach attainment. At present, the state has a 95 tpd shortfall in the Baltimore, and a 48 tpd shortfall in the National Capital AQCR.[339]

Maryland projects its proposed May 1 to September 15 fuel RVP limits will reduce VOC emissions 82.5 tpd statewide.

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[336]*EPA, Northeast States Reach Agreement on Deadline for Phase II Gasoline Volatility*, 20 Env't. Rep. (BNA) No. 38, at 1628 (January 19, 1990).

[337]MD. REGS. CODE 26.11.13.01-.06. (1990).

[338]*Proposed Rule, Approval and Promulgation of Implementation Plans: Revision to the State of Maryland Implementation Plan for Ozone*, 55 Fed. Reg. 20,479 (May 17, 1990).

[339]*id.* at 20,480.

with 49.5 tpd credited to Baltimore and 33 tpd to the National Capital AQCR. These figures represent 11% and 16.3% of their respective 1980 VOC inventories. Measuring the benefit of the Maryland proposal is complicated by its reliance on 1980 inventory data, which grossly underestimated evaporative emissions. The model used in 1980 had assumed 9.0 gasoline was in-use while calculating certain types of emissions from operating vehicles. The result was a probable underestimate of the emissions inventory. EPA adjusted (reduced) Maryland's projected emissions reductions in its proposed 9.0 SIP revision, to account for the state's 1980 assumption that 9.0 gasoline would be used in its vehicles.[400]

Projected VOC reductions include:[401]

Maryland's Leading VOC Reduction Strategies

	Baltimore AQCR		Capital	
Reducing RVP from 10.5 to 9.5 psi	49.5 tpd	11.0%	33.0 tpd	16.3%
Stage II controls	12.0 tpd	2.7%	8.0 tpd	3.3%
Enhanced I/M	7.0 tpd	1.6%	5.0 tpd	2.5%
Solvent recovery	3.7 tpd	2.2%	6,0 tpd	2.96%
Architectural coatings	8.0 tpd	.3%	4.[illegible] tpd	2.0%
Fleet alternative fuels	4.6 tpd	1.0%	3.1 tpd	1.5%
Can manufacturing	3.8 tpd	.84%	------	----
Pesticide application	2.0 tpd	.44%	.9 tpd	.44%
High occupancy vehicle program	1.8 tpd	.4%	1.1 tpd	.54%
Auto refinishing	1.5 tpd	.3%	.8 tpd	.33%
Auto undercoating	1.6 tpd	.35%	.6 tpd	.23%

Percentage reduction from 1980 inventory.

Figure 15

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[400] *id.* at 20,480.

[401] *id.* at 20,481.

According to MDE and EPA, the 9.0 psi RVP is the most significant and key reduction strategy for both AQCR's. EPA cites supply and distribution problems and the regional transport of ozone and ozone precursors are cited as justifications for statewide controls.[402]

As of July 22, 1990, EPA had not published its approval of this SIP revision.

F. Delaware

In February 1990,, Delaware's Department of Natural Resources and Environmental Control announced its adoption of a 9.0 psi rule for its state. Coverage was intended to extend from May 15 to September 15 in 1990; and from May 1 to September 15 in later years.[403] This proposal had not been published in the Federal Register as of 22 July 1990.

G. Another Distribution Choke Point?

Maryland has evidently expressed its intent to extend its enforcement activity to gasoline which is merely in transit through the state.[404] Neither the Maryland or Delaware regulations allow the +.3 psi enforcement tolerance found in

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[402] id. at 20.481-82.

[403] *Delaware Adopts Fuel Volatility, Inspection Rules*, 20 Env't. Rep. (BNA) No. 44, at 1381 (March 2, 1990).

[404] Kerr, *MOGAS Now a Drugstore Item with Variety of New RVP Specs*, 68 PLATT'S OILGRAM REPORT No. 78, at 1-A (April 23, 1990).

New York, New Jersey and other NESCAUM states. Due to its concern about testing inconsistencies, Colonial Pipeline has indicated if U.S. EPA approves their regulations, it will require gasoline it ships to those states to have no more than 8.5 psi Reid Vapor Pressure.[405]

H. Northern Illinois

Not surprisingly, the Chicago-Gary-Lake County Consolidated Metropolitan Statistical Area is nonattainment for ozone. In 1988, the Environmental Protection Agency disapproved SIP revisions submitted by Illinois and Indiana. After a lawsuit by Wisconsin, since November 1989, the USEPA has been obliged by a settlement agreement to develop a Federal Implementation plan for Chicago.[406]

In late April 1989, the Illinois Pollution Control Board received a proposed rule submitted by the Chicago Lung Association. This rule proposed a 9.0 psi limit for gasoline sold in Illinois from July 1 through August 31. After hearings, the board adopted two regulations. The first, Rule 88-30[A] was an "emergency" measure for the summer of 1990. As an emergency measure, it could be adopted without economic

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[405]Dittrick, *Exxon's Reformulated Gasoline Aimed at Air Problems*, United Press International (Houston)(April 26, 1990)*and see, Market News & Notes*, 68 PLATT'S OILGRAM PRICE REPORT No. 53, at 1-A (March 16, 1990).

[406]This suit was initiated by Wisconsin. *See generally*, Proposed Rule, *Approval and Promulgation of Implementation Plans: Illinois*, 55 Fed. Reg. 20,806 20,807-8 nn.3-4 (May 21, 1990)[hereinafter Proposed Rule: Illinois].

impact analysis and remain effective for 150 days. An identical, non-emergency measure applicable to future years, Rule 88-30[B], was also adopted by the board, and is undergoing economic impact analysis. Each rule proposes a 9.5 psi limit for northern Illinois in July and August. After making USEPA required adjustments, the emergency rule[407] was submitted by Illinois Environmental Protection Agency [IEPA] as a proposed SIP revision on April 6, 1990. USEPA proposed its approval six weeks later.[408]

In its preparation of the Federal Implementation Plan, U.S. EPA has calculated Chicago needs to reduce VOC emissions by 71% from their base year 1988 level if it is to reach attainment. U.S. EPA has also compared relative impacts of a 9.0 psi limit with other strategies available in Chicago.

Chicago CMSA Alternative VOC Reduction Strategies

Reducing RVP from 10.5 to 9.0 psi	223.2	tons/day	8.7%
Generic rule for "non-CTG" sources	131.5	tons/day	5.2%
Vehicle coating operations	47.1	tons/day	1.8%
Stage II refueling controls	37.7	tons/day	1.5%
Architectural surface coatings	38.9	tons/day	1.5%
Volatile Organic Liquid Storage	33.3	tons/day	1.3%
Surface coating, metal parts	29.8	tons/day	1.2%
Surface coating, paper, fabric & film	22.5	tons/day	.9%
Graphic arts	15.4	tons/day	.6%
Solvent metal cleaning	8.2	tons/day	.3%
Petroleum refinery wastewater treatment	3.2	tons/day	.1%

Percentage reductions from 1988 VOC inventory.
100% effectiveness assumed for each measure.

Figure 16

[407] ILL. ADMIN. CODE, tit. 35, Subpart Y § 215.585 (1989).

[408] Proposed Rule: Illinois, supra note 406, at 20,806.

U.S. EPA modeling credited its Phase I standard (10.5 psi) with a 219.6 ton (8.6%) reduction from the 1988 inventory. Illinois' proposed 9.5 limit will not have quite as much impact. The 1 psi reduction from 10.5 to 9.5 psi is expected to reduce daily mobile source VOC emissions by 177.9 tons (7%) per day. As usual, running losses have not yet been calculated into the inventory or the projected emissions reductions.[409] IEPA calculates reductions in the Chicago CMSA may be as low as 147.82 tons/day.[410]

U.S. EPA approved the SIP revision July 18, 1990.[411] By reducing the proposed cut in RVP to 9.5 psi instead of the 9.0 level recommended by the Lung Association, Illinois unified its regulatory scheme. In 1991, bulk terminals and plants must distribute 9.5 psi gasoline in Illinois both north and south of 40^0 Latitude in July and August.[412]

It is questionable whether this SIP revision will actually produce the VOC reductions predicted by government

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[409] *id.* at 20,808. Illinois will still be far short of its 71% VOC reduction goal, with 9.5 or even 9.0 psi gasoline.

[410] Notice of Final Rulemaking, *Approval and Promulgation of Implementation Plans; Illinois*, 55 Fed. Reg. 29,200 (July 18, 1990)(LEXIS, Genfed library, Fedreg file)[hereinafter Final Rulemaking: Illinois].

[411] The late approval means enforcement during 1990 will only extend from August 17 to August 31. *id.*

[412] See Appendix VI, "EPA's RVP Standards for Summer 1989-91" to compare the treatment of northern and southern Illinois in U.S. EPA's Phase I program.

modeling. Most of Illinois' seven refiners do not have sufficient capacity to refine, store and ship separate RVP grades of gasoline. Historically, they generally have distributed fuel meeting the tougher southern Illinois standard throughout the state.[413] With greater refinery capacity, AMOCO had been shipping separate grades to north and south Illinois, but as part of a "green" advertising strategy was already committed to selling 9.5 RVP fuel in northern Illinois in 1990.[414] In 1989, U.S. EPA testing under its Phase I program determined most gasoline sold in Chicago during July and August was already under 9.5 psi.[415]

I. Dallas/Fort Worth Texas

As early as December 1987, planners for the Dallas-Fort Worth Air Quality Control Region (an ozone nonattainment area) were developing a revision of their SIP which called for restrictions on gasoline vapor pressure, if EPA failed to carry through with its own proposal. The plan's

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[413] Murphy, *Despite Feds, Ill. May be One-Gas State*, Crain's Chicago Business 3 (March 20, 1989).

[414] *Illinois Gets Tougher on Vapor Pressure Levels*, 82 NATIONAL PETROLEUM NEWS No. 5, at 14 (May 1990).

[415] U.S. EPA raised this point while justifying allowing only 30 days leadtime from date of publication to date of enforcement of its final rule. Final Rulemaking: Illinois, supra note 410.

demonstration of attainment assumed a 9.0 psi RVP.[416] Phase I as adopted by EPA assigned "eastern" Texas an RVP of 10.5 psi in May and 9.5 psi for the rest of the summer.[417]

The Texas Air Control Board [TACB] began hearings in the summer of 1989 to devise means to overcome the shortfall in expected VOC emission reductions. In December, they adopted regulations prohibiting the storage or transfer of gasoline in excess of 9.0 psi, at retail stations from June 1 through September 16, and at all other facilities from May 1 through September 16, throughout the Dallas-Fort Worth Consolidated Metropolitan Statistical Area.[418] The regulations were submitted to EPA as an SIP revision, March 5, 1990.

The TACB estimated Dallas and Tarrant [Fort Worth] counties would have to reduce their 1983 VOC emission inventory by 43.9% and 41.7% respectively to achieve attainment status. In submitting the revision, TACB reviewed

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[416]Proposed Rule; Deferral of Sanctions, *Approval and Promulgation of Implementation Plan; Texas*, 54 Fed. Reg. 6302, 6306 (February 9, 1989); *and see, Dallas, Fort Worth Plan Emission Controls in Effort to Forestall 1987 Ozone Sanctions*, 18 Env't. Rep. (BNA) No. 32, at 1815 (December 4, 1987).

[417]The reader can compare EPA's proposed and actual Phase I and II RVP levels at Appendices IV, V, VI and VIII.

[418]TEX. ADMIN. CODE tit. 31, §§ 115.242-.249. The Dallas-Fort Worth Consolidated Metropolitan Statistical Area [CMSA] includes Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall and Tarrant [Fort Worth] counties; (total population: 2,330,033). Only Dallas and Tarrant counties are actually in nonattainment status for ozone.

up to 30 VOC reduction strategies, including:[413]

Dallas/Fort Worth Reduction Strategies

	Dallas	Tarrant
Highway vehicle RVP, federal standard 9.5 psi	6.0%	3.5%
Gasoline Station RVP, federal standard 9.5 psi	<0.5%	<0.6%
Federal Motor Vehicle Controls,fleet replacement and growth	20.5%	17.1%
Vehicle Anti-tampering program (ATP)	5.7%	5.3%
"Regulation 5" miscellaneous regulation etc in Harris County	3.4%	7.3%
I/M program	2.2%	2.7%
Process vents	1.8%	1.4%
Architectural coatings	1.8%	1.8%
Cutback asphalt	1.4%	1.3%
Transportation controls	1.2%	0.3%
Auto refinishing	0.5%	0.5%
Consumer solvents	0.5%	0.5%
Graphic arts	0.3%	0.3%
ATP Collin and Denton counties	0.3%	<0.1%
Gasoline terminals	0.1%	0.2%
ATP other CMSA counties	<0.1%	0.3%
Aircraft prime coating	<0.1%	0.1%
Growth - permits	-5.4%	7.2%
Net total without state 9.0 RVP control	<42.1%	<43.8%
Reductions needed for attainment	43.3%	41.7%
Reduction shortfall or excess	-1.8%	+2.1%

Figure 17

EPA seems no more reluctant to approve distribution of 9.0 psi gasoline to the attainment counties within the Dallas-Fort Worth CMSA, than it was to require distribution of 9.0 psi gasoline to the huge sections of New York and Maine which were in attainment status. The specific reductions expected of the 9.0 psi limit are not projected, but, according to EPA:

In light of the fact that Texas does not currently have

[413]Proposed Rule, *Approval and Promulgation of Air Quality Implementation Plans; State of Texas: Control of Gasoline Volatility*, 55 Fed. Reg. 18,005, 18,006 (April 30, 1990).

> an approvable control strategy for Dallas and Tarrant Counties, nor does it have an attainment demonstration for the remaining CMSA counties, EPA cannot now conclude that the RVP program is not necessary to achieve the standard as expeditiously as practicable in those areas. Until EPA is in a position to conclude that the program is definitely not necessary, the Agency believes it is appropriate to make a finding under section 211(c)(4)(C) with respect to the RVP program in the CMSA. EPA believes that the RVP rules must be approved for the entire Dallas-Fort Worth CMSA in order to avoid significant supply, distribution and compliance problems. In addition, the RVP rules must be approved for all the CMSA counties because of the intercounty travel of vehicles throughout the CMSA. The effectiveness of the volatility controls in Dallas County would be significantly reduced and attainment would likely be delayed, if the large population of motorists who routinely commute into Dallas from the surrounding counties are allowed to refuel with higher volatility gasoline outside of Dallas and then drive into the city.[420]

While EPA approval of the SIP revision is still pending in July 1990, Explorer pipeline required its customers to limit gasoline shipments to Dallas-Fort Worth to 8.5 psi, beginning March 20, 1990.[421]

IX. EPA Adopts its Phase II Regulation

A. EPA Abandons the ASTM Approach

With its Administrator, William K. Reilly hailing the measure as the remaining VOC control strategy which could achieve the single largest reduction in emissions (about 7%);

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[420] *id.* at 18,007.

[421] *Explorer Changes to 8.5 psi RVP for D/FW Area*, 68 PLATT'S OILGRAM PRICE REPORT No. 46, at 1-A (March 7, 1990).

the Environmental Protection Agency promulgated its Phase II Reid Vapor Pressure Regulation in June, 1990.[422] Phase II is scheduled to replace the Phase I standard in the summer of 1992.

The Phase II program followed the same course as its predecessor by excluding Alaska, Hawaii and U.S. territories from regulation. "These areas have separate fuel supply networks and no current or expected ozone attainment problems."[423] EPA also kept the +1 psi allowance for ethanol blends while making no special allowance for methanol.[424] Apart from these similarities, in its June 1990 *dénouement*, Phase II departed from the methodology and philosophy of both its Phase I predecessor and the original Phase II proposal.

A cursory comparison between the final Phase I (Appendix VI) and the Phase II standards as promulgated (Appendix VIII) dramatically shows how EPA both toughened and simplified its regulatory approach:

- In Phase II, the agency eliminated all division of states into separate regulatory areas, (e.g. Illinois, North and South of 40^0 Latitude).
- Only two grades of gasoline are designated, roughly

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[422]Final Rulemaking-Phase II, *supra* note 222.

[423]*id.* at 23,660.

[424]*See generally*, "**V. Analysis of Economic and Environmental Impacts, *B. Alcohol Blend RVP Control***" *id.* at 23,665-66.

equivalent to further reduced versions of the B and C grades used in Phase I. Grade A is eliminated.

- Midsummer changes in the required grade of gasoline are drastically reduced.

In its final rulemaking, U.S. EPA extended one other break to the oil market. Although the RVP limits are lowered and thus will be tougher to meet, the agency will adopt a +.3 psi enforcement tolerance in Phase II. The agency has reserved the right to reduce or eliminate this tolerance if more accurate or consistent testing procedures can be developed.[425]

The petroleum industry's major complaints with Phase I has been the strain it places on distributors attempting to comply with month-to-month adjustments in RVP through the summer; and particularly the difficulties it poses for those participants in the interstate market who must comply with up to five different enforcement schemes. (Six if they market gasoline in California). After the *American Petroleum Institute v. Jorling* settlement, API and other industry representatives expressed a preference for a nationwide RVP standard of 9.0 psi rather than a patchwork of state regulations.[426]

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[425] *Id.* at 23,660.

[426] *E.g.* comments of API Vice-President for Health and Environment, Terry F. Yosie in *API Tells D.C.: Don't Forget Gasoline in Clean Air Plan; Stumps for '9' RVP Standard.* 67 PLATT'S OILGRAM NEWS No. 146, at 3 (August 1, 1989).

Phase II's greater uniformity in national standards and reduction in midsummer adjustments to RVP should simplify the industry's production and marketing schedules. Phase I employed five separate regulatory schedules. Phase II has just two. Phase I requires RVP to be reduced in six states midway through the summer. In fourteen other states, Phase I requires RVP to be lowered at midsummer, and then allows it to rise again in September. In contrast, Phase II starts all jurisdictions at 9.0 psi in May. Twenty-six states stay at 9.0 psi throughout the summer. In the other twenty-two states and the District of Columbia, RVP is reduced to 7.8 psi in June, and is kept there the rest of the summer.

In Phase I, EPA adapted the existing ASTM engine performance oriented standards to suit the goals of air quality control. The ASTM standards were designed to insure uniform vehicle performance, throughout the country, through all twelve months of the year. After Phase I was promulgated, the Environmental Protection Agency decided to abandon the ASTM approach. It has attempted to design RVP standards which will produce uniform emissions per vehicle, throughout the 48 contiguous states, throughout the summer. Emissions are to be kept equivalent to the average July emissions of vehicles in Phase I, "Class C" areas, using 9.0 psi RVP gasoline.[427]

To reach this goal, the site altitude for various ozone

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[427]FRIA: PHASE II REGULATION, supra note 7, at p. 2-6.

monitoring stations in the lower 48 states was recorded. Using 1985-87 data, the days each monitor recorded ozone levels above .08 ppm were recorded. Temperature readings for those days was obtained from the weather stations geographically closest to the ozone monitors. EPA then modeled an emissions factor for the ten warmest days in each month at each monitor. A monthly average was then computed for each monitor. With four exceptions, those averages were weighted to match population and then calculated as an RVP.[428]

As Appendix IX illustrates, the agency discovered climate based, equivalent emission standards would result in an impossibly wide variation in RVP levels between adjacent states. Even within individual states, equivalent emissions standards fluctuated widely month-to-month.

Next, EPA computed new gasoline classifications. The agency studied the VOC emissions from vehicles fueled with 9.0 psi gasoline in certain Northeastern and Midwestern

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[428] In California, monitoring stations were redesignated after computation of the figures from the coastal stations initially selected produced seemingly unrealistically high RVP levels. Arkansas' July RVP was thought to be unrealistically low. Little Rock had very high July temperatures, but the only nonattainment area in the state was a small section in the Memphis Consolidated Metropolitan Statistical Area [CMSA]. Arkansas' July RVP was redesignated to match the Tennessee July RVP. New Jersey's May and June RVP were very low, due to a few high temperatures experienced in its portion of the New York City Metropolitan Area. The relative population there is so high that population weighted averaging completely skewed the state's figures. RVP was recalculated in those two months without using the highest NYCMA temperatures for those months. Due to insufficient data, the District of Columbia was assigned the Virginia average. *Id.* at pp. 2-6, 2-7.

states [ASTM/Phase I Class C areas] on high ozone days in those states. EPA then computed three prototype gasoline classes. Each class was intended to result in the minimum mean squared difference between the emission inventory for the class and the emission inventories for the baseline Class 'C' areas.[429] Then EPA computed prototype RVP levels for each state, for each of the five summer months which would produce emissions equivalent to those emitted by the test vehicles in the northeast and midwest. Those designations are found at Appendix X. The three levels obtained by this method, coincided exactly with the levels EPA had proposed for Phase II back in 1987, after simply making reductions for Class A and B mathematically proportional to a cut in Class C from 11.5 to 9.0 psi.

EPA was rather disingenuous about its " simplification" process. EPA both loosened and tightened the stringency of its standards. Only two states, Utah and Arizona, qualified for use of the new Class A gasoline. Rather than complicate gasoline refining and marketing in these states, EPA redesignated them to Class B.[430] However, overall, EPA

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[429]Calculations produced a range of values for Class 'B' and Class 'C' gasolines:
Class A = 7.0 psi; Class B = 7.1-8.5 psi; Class C = 8.6 psi.
Class A was then set at 7.0 psi; all Class B areas at 7.8 psi; and all Class C areas at 9.0 psi.
id. at pp. 2-7, 2-10.

[430]Phoenix receives most of its gasoline from California refineries. Utah is a relatively small market, and its refineries earn much of their profits in surrounding states. Final Rulemaking-Phase II, supra note 222, at 23,660.

"simplified" production schedules by toughening standards. Maryland had only one month of 7.8 equivalent emissions, but in the regulation must meet that standard from July through September. Rather than seeking uniformity by raising the 7.8 September equivalent emissions designation found in three states to 9.0 psi; EPA lowered September's 9.0 Equivalent Emissions Analysis Designation to a regulatory standard of 7.8 in sixteen states and the District of Columbia.[431]

EPA indicated it would continue to be receptive to SIP revisions from Nonattainment states wishing to impose more stringent standards than provided in the EPA schedule. EPA will also consider petitions from state governors seeking to ease local supply difficulties by loosening the federal standards in their states. Nonattainment states making this latter type of request would have to submit SIP revisions designed to recoup the VOC savings lost with the increase in RVP. EPA did make one gesture to its stated objective of simplification. Any state changes in allowable RVP will be limited to one gasoline class. No increase in RVP in Class C months will be permitted.[432]

The agency also answered oil company concerns about "transition" month driveability problems: the stalling, hesitation, and acceleration problems tied to cool spring

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[431]Compare the designations (Appendix X) to the RVP standards as actually set in the regulation (Appendix VIII).

[432]Final Rulemaking-Phase II, supra note 222, at 23,660.

mornings experienced in northern states. EPA calculated "true vapor pressures" of fuels sold in various cities in January to the "true vapor pressure" of Phase II fuels in those cities in April.[433] In a majority of cities, true vapor pressure was found to be higher in April than in January.[434] In other words, the agency felt cold starts with low RVP fuel in April would be no more of a problem than cold starts with high RVP fuel in January.

B. Preemption of the California Standard

EPA's Phase II standard for California is more stringent than the 9.0 standard that state has used since the 1970's. Unless the California Air Resources Board copies the EPA standard or adopts an even more stringent standard,[435] its regulations will be preempted when Phase II is implemented in 1992. In earlier years CARB rejected the option of going to 7.0 psi due to concern such a low RVP would increase exhaust emissions by 4 to 8%, especially in cooler morning temperatures. (However, California did not calculate the savings in running loss emissions due to reducing RVP.)[436] The CARB staff is in the process of preparing draft

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[433]"True vapor pressure" adjusts gasoline RVP as it is affected by temperature.

[434]FRIA: PHASE II REGULATIONS , supra note 7, at pp. 4-44 and 4-45.

[435]42 U.S.C. § 7543(b)(2) (1989).

[436]FRIA: PHASE II REGULATIONS, supra note 7, at p. 3-17.

regulations for presentation to the board in September 1990. The planned fuel-content regulation includes limits on lead, bromine and aromatic content. Although the staff had planned upon preparing an 8.0 psi RVP limit,[437] one would expect CARB to simply readjust that limit to at least match the federal government's 7.8 psi, June-September California Phase II standard.

C. Costs, Benefits and Risks of Phase II Regulation

As already stated, reduction of RVP requires reducing the amount of butane in the gasoline mixture. The lower the RVP, the less butane which is added. If RVP is lowered sufficiently, butane naturally generated during refining must actually be removed from the gasoline process streams. The gasoline fractions used to replace this ±5% missing volume are all more expensive than butane. The lower the RVP, the more expensive is the gasoline.

For its rulemaking in 1987, EPA forecast the 1992 standards as proposed would cost refiners 405 million dollars per year. API, the oil industry trade group, commissioned a study which estimated the cost for the same program to approach 1.5 billion dollars per year. How to explain the variance? API changed a few of the assumptions:

- EPA had assumed each spring, refiners and importers

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[437] *Calif. Board Urges CNG Outlets at Service Stations, Along with Clean Fuels*, 68 PLATT'S OILGRAM NEWS No. 103, at 4 (May 29, 1990).

would need 30 days lead time to bring retailers stocks into compliance; API thought 60 days was more realistic.

- EPA's study assumed a true national standard. API's included the cost of complying with differing standards in California and, potentially some other states.
- API factored into its study a "nominal compliance margin". [Their study assumed refiners would target production to produce gasolines with an RVP somewhat below the maximum standard allowed in order to minimize the risk of vicarious liability as gasoline was stored and dispensed by midstream and downstream participants in the market].

API believed adjusting these factors alone would add 460 million dollars to the annual cost of the program. Another 375 million dollars was added to their estimate to cover the cost of the 2.5 billion dollar capital investment needed to produce the very low RVP gasolines called for by Phase II.[438]

With domestic production falling, the gasoline needed to replace butane will be imported gasoline. EPA's study estimated an additional 260,000 barrels per day over 5 months, (cost: $ 935 million). API's estimate added its extra month of transition time and estimated 410,000 barrels

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[438]Testimony of Joe T. McMillan, supra note 31, at 11.

per day for six months, (cost: $ 1.5 billion).[439]

API also strongly advocated EPA not go on to Phase II, arguing the laws of diminishing returns. API projected its 9.0/9.5/10.5 standard would produce 84% of the VOC emission reductions the EPA's proposed Phase II regulations in 1991, and 77% in 2010. Meanwhile, the capital investment and the cost of the extra gasoline needed to meet the proposed Phase II standard were expected to cost the industry at least an additional 18 billion dollars between 1992 and 2010.[440] In its Final Regulatory Impact Analysis, EPA predicted the effect in 1995, of its either imposing no RVP control, stopping at Phase I, or proceeding to Phase II.[441]

1995 Non-Northeast Urban Ozone Nonattainment
Area VOC Emissions Inventory (1000 tons)

Emission Source	Base	Phase I	Phase II
Exhaust	1177.5	1113.2	1067.5
Evaporative	791.0	593.8	365.1
Refueling	202.3	191.3	161.2
Running loss	1061.1	789.7	330.9
	3216.8	2769.9	2057.4
Total Stationary Source	5412.1	5412.1	5412.1
Total Inventory	8628.9	8182.0	7469.5

*Mobile source totals do not quite match sum of exhaust, evaporative, refueling and running loss emissions due to rounding off during EPA's calculations.

Figure 18

[439] *id.* at 12.

[440] *id.* at 13-14.

[441] FRIA: PHASE II REGULATIONS, *supra* note 7, at p. 3-32, Table 3-6.

Phase II is expected to bring as many as 32 of the 70 non-Northeast nonattainment areas into compliance with the ozone NAAQS.[442] Cost to refiners in 1995 is expected to be about $464 million per year, (1.1 cent per gallon). Fuel economy savings of $127 million and reduce evaporative losses of $107 million per year will reduce the annual net cost to consumers to $230 million each year.[443] Imports of crude oil are expected to increase by 152,000 barrels per day, (equivalent to 3% of 1989 imports and 1% of total crude oil consumption).[444]

The necessity to produce very large quantities of debutanized gas demanded by the toughened RVP limits will strain the refiners and importers, and will undoubtedly cost consumers at the pump. Due to limits in their crude oil supplies and/or physical plant, EPA expects some refiners will not able to use the most economical methods to meet the *Phase II standards when enforcement begins in 1992.* As a short term fix, the Agency suggests these refiners replace butane by shifting some of their high octane components currently used to produce premium grades to production of regular. Or, they may purchase or shift production to add

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[442] Final Rulemaking-Phase II, supra note 222, at 23,662.

[443] *id.*

[444] *id.* at 23,664.

alkylates, toluene, xylene or MTBE as butane substitutes.[445]

Similarly, EPA's answers for the ±5% fuel volume lost with the butane are: more intensive use of U.S. refining capacity; increased imports of finished gasoline; and less "severe" processing of crude oil to increase the percentage of gasoline produced. (Less "severe" methods reduce the fraction of butane and other light end components and increases the fraction of base gasoline produced during the refining process). This last option is not available to those companies lacking octane enhancers, since "severe" processing is needed to increase the fraction of aromatics. Over the long term, companies that don't have them can invest in more economical debutanizers (and depentanizers for those making 7.8 psi fuel).[446]

EPA estimates Phase I "displaced" between 5.5 and 17 million barrels of butane each year. The more stringent Phase II controls will annually displace around 40 million barrels of butane.[447] Some refiners can store the butane removed from the process stream in the tanks formerly used to store butane purchased from NGL producers. That leaves the question of what to do with it. In the words of one oil company spokesman, "The United States would be hard-pressed

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[445]FRIA: PHASE II REGULATIONS, supra note 7, at pp. 4-2, 4-3.

[446]*id.* at pp. 4-2 through 4-4.

[447]*id.* at pp. 4-25, 4-26.

to come up with a use for all those light hydrocarbons."[448] EPA believes this butane can be used as "feedstock" for MTBE and alkyiate production.[449]

Another controversy generated by the deep cuts in Phase II was the relative risk of fire and explosion in cars fueled with high versus low volatility fuel. Gasoline vapors are only explosive if they are mixed with air. Any mixture with more than 7.6% gasoline vapor is not flammable. Refiners raised the issue of low RVP summer grade gasoline being sold and found in automobile fuel tanks during spring transition period "cold snaps". If the low RVP gasoline did not generate enough vapor, the ratio of air to fuel vapor could increase sufficiently to make the tank explosive.[450]

EPA refuted this argument, citing the safe track record of 9.0 psi fuel use in California. Another telling factor in EPA's decision must have been a study completed by the Center for Auto Safety [CAS] in 1988. CAS calculated gasoline's average volatility had risen from 9.2 psi to 10.4 psi in a period of just seven years (1979-86). The Center analyzed 146,000 vehicle safety reports filed at the National Traffic Safety Administration since 1977; and the 4,276 safety-

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[448]Jack Freeman, Sun Oil Company, *quoted in, EPA Sends Vapor Recovery Proposal to OMB, Includes Onboard, Fuel Volatility Controls*, 17 Env't. Rep. (BNA) No. 48, at 1995 (March 27, 1987).

[449]FRIA: PHASE II REGULATIONS, *supra* note 7, at pp. 4-12, 4-26.

[450]*id.* at pp. 4-43 through 4-48.

related recalls since 1966, which involved 130,000,000 vehicles. "Over pressurized" fuel systems, fuel spurting and foaming, vapor lock and other problems attributed to excess fuel volatility had been the subject of about 100 NHTSA reports per year after 1983, compared to less than ten reports per year during the period 1978-80. More significantly, a total of 71 vehicle fires, involving 25 injuries and 2 fatalities were also attributed to excess volatility.[451]

EPA also returned to its calculations of "True Vapor Pressure" [TVP] of different RVP fuels at a large number of American cities, using historic temperatures. Generally, TVP's were higher (safer) with EPA's summer grade gasolines in April, than with ASTM winter grade gasolines in January. All April TVP's were well above the minimum safe level needed to generate over 7.6% gasoline vapor in a car's fuel tank.[452]

D. Future Developments

The agency's Phase II controls mirrored proposals

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[451]The "excess" volatility problem discovered by CAS was more of a "gasohol" problem than a "gasoline" problem. States with gasohol sales equal or greater than 7% of the market were the source of 52% of the fuel safety complaints, even though they were home to only about one-third of the U.S. vehicle population. *Automotive Vapor Recovery Equipment Poses Little Hazard, Auto Safety Center Says*, 18 Env't. Rep. (BNA) No. 50, at 2428 (8 April 1988) (quoting, CENTER FOR AUTO SAFETY, STOPPING VEHICLE FIRES AND REDUCING EVAPORATIVE EMISSIONS: THE NEED TO CONTROL GASOLINE AND ALCOHOL BLEND VOLATILITY (1988)).

[452]FRIA: PHASE II REGULATIONS, *supra* note 7, at p. 4-45.

already written into the pending (as of July 1990) Clean Air Act amendments.[453] Both the Senate and House Bill add a Paragraph (h) to Section 211 of the Clean Air Act. In each case the EPA Administrator is given six months from the date of enactment to promulgate rules making it unlawful for any person to "...sell, offer for sale, dispense, supply, offer for supply, transport, or introduce into commerce gasoline with a Reid Vapor Pressure in excess of 9.0 pounds per square inch." The Administrator is authorized to impose tougher standards as needed, and 10% ethanol blends continue to receive a + 1 psi allowance.[454]

The strains imposed upon the refining and fuel distribution systems by RVP regulations may have merely foreshadowed severer problems in the new Clean Air Act Amendments. The new act may require use of oxygenated and reformulated fuels in nine or more of the most severely polluted communities. The distortions created by NESCAUM regulation may pale to those created by the necessity of providing widely scattered, selected urban markets with specially reformulated gasolines.

Congress may also limit the content of benzene, aromatics and other "undesirable" components. Reformulated

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[453]H.R. 3030 and S. 1630 (1990); *Volatility Limit of Gasoline Lowered During Summer Months Beginning in 1992*, 21 Env't. Rep. (BNA) No. 6, at 311 (June 8, 1990).

[454]S. 1630, 101st Cong. 2d Sess. § 216 (1990); H.R. 3030 101st Cong. 2d Sess. § 216 (1990).

gasolines are already in some markets, such as the Los Angeles basin and the Front Range of the Rockies. But so far, reductions in selected areas have been made at the expense of adding undesirable components to the base stock sold in other areas.[455] Mandated reductions would require this practice to be continued, or for the excess components to be exported,[456] or incinerated.

X. Conclusion

Given the lack of alternatives, Reid vapor pressure regulation may be our "last, best hope" of reducing an intractable ozone pollution problem without dramatically altering American lifestyles. National RVP regulation has additional attractions:

- VOC reductions are not dependent upon the replacement of the vehicle fleet;
- It focuses VOC reductions in the high temperature summer season they are needed most;
- The government's regulation and inspection of participants in the gasoline market intrudes into the lives of fewer citizens than the transportation

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[455] Unzelman, *Options to Meet 1990's Fuel Composition Rules Limited*, OIL & GAS J., April 23, 1990, at 31, 33.

[456] *id.*

and area controls which are the most likely alternatives to VOC regulation:

- And, to the extent costs of the program are included in the purchase price of the gasoline, the biggest polluters pay the biggest price for pollution control.

RVP regulation does have its downside:

- The demand for additional gasoline caused by the debutanizing of gasoline worsens our balance of payments problem and deepens the strategic vulnerability of the United States to cut-offs of foreign oil supplies.
- The price increases attributable to debutanizing gasoline are inflationary without being of sufficient magnitude to truly discourage consumption.
- An old saying in business is, "You make money from regulations and bottlenecks, not supply and demand."[457] Regulation can be a windfall for some, and a disaster for others. Strictures designed to fit "average" refineries and to meet "average" transportation times can dramatically alter the profitability, competitiveness and economic health of individual businesses in both the oil marketing

[457] Verleger, supra note 283, at 1.

and natural gas industries.[458]

The "fly in the RVP ointment" is state regulation. When a state revises its State Implementation Plan for stationary or area sources, or when it imposes a transportation plan: its own citizens bear the brunt of the inconvenience, cost and risk of job loss. In contrast, the Phase I round of NESCAUM SIP revisions setting 9.0 psi limits has a pernicious aspect. Gasoline marketing may be the ultimate interstate business. Depending upon its geographic location and/or the size of its own market, through an SIP revision a state may be able to force consumers in other states to consume low RVP gasoline. Although this may have beneficial air quality control impacts, it may negate the policy decisions government administrators and elected officials in those states made on behalf of their own constituents. Furthermore, through arbitrage and increased competition for stocks of crude oil and gasoline, consumers all over the country may pay 50% or more of the real cost of a state program benefiting one state.

The Phase II program would limit dramatic variations from the EPA standard. It purports to limit state modifications in their RVP limits to a one grade difference

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[458] "The outlook is for continued attrition of small refineries and independent refiners in the U.S., a trend that commenced in the early 1970's with the oil embargo and accelerated with lead phase down. Because of the need for capital to handle fuel regulatory requirements, foreign interest in U.S. refining will continue to rise." Unzelman, *supra* note 455, at 31, 33.

from the EPA plan. Whether that position could be sustained if a Class C nonattainment state submitted a State Implementation Plan revision "proving" a reduction to Class A was "necessary" and reasonable may be questionable. After all, in justifying the NESCAUM SIP revisions, U.S. EPA suggested it really had no option but approval once a state proved its revision to 9.0 psi was "necessary".[459]

It appears the new Clean Air Act will codify EPA's Phase II 9.0 psi limit, and general regulatory approach to RVP regulation. However, the processing and marketing distortions imposed by the RVP limits may pale in importance as the legislators add demands for oxygenated and reformulated fuels in specific nonattainment areas.

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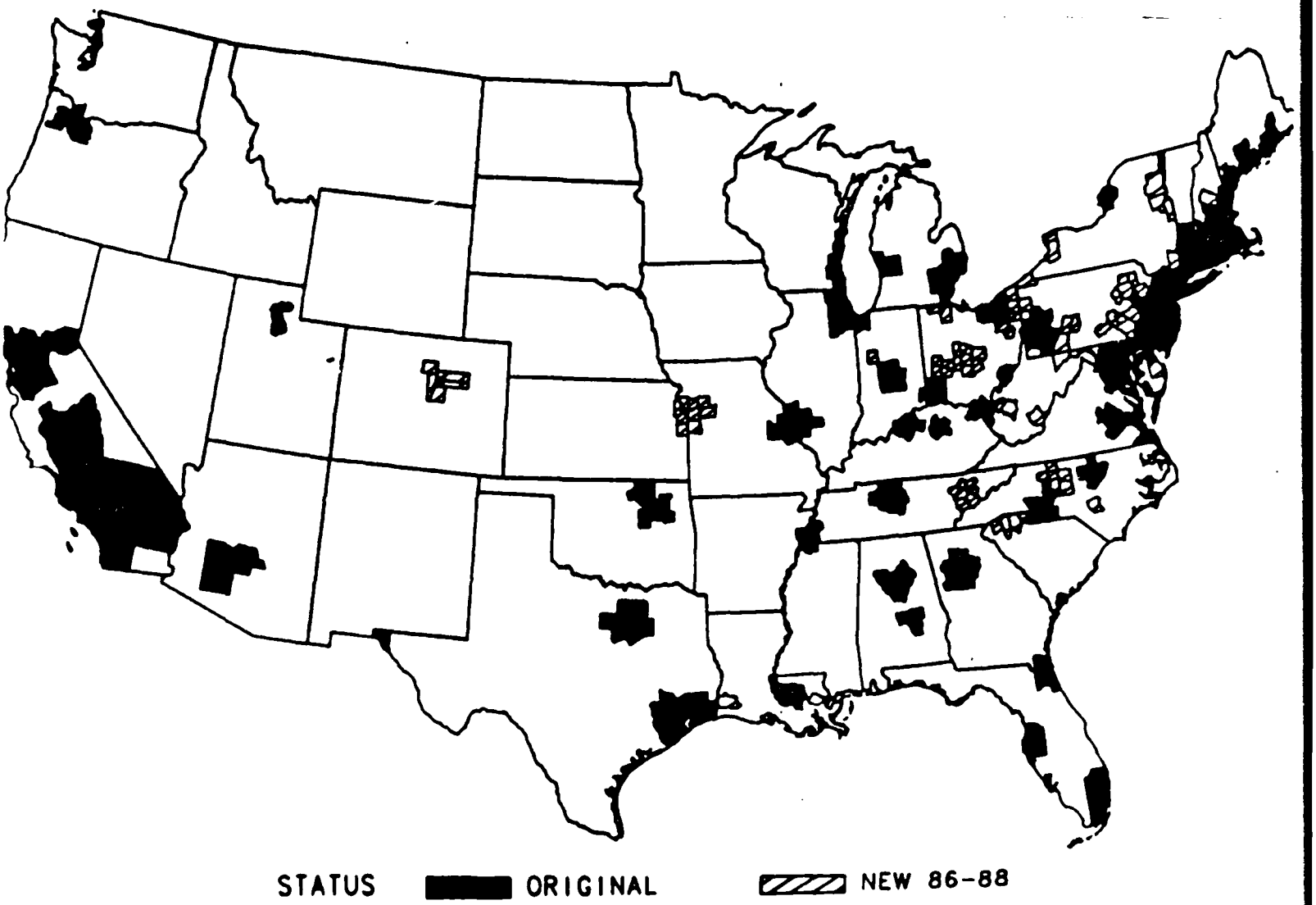
[459] See the discussion of EPA's approval of the Massachusetts 9.0 psi RVP State Implementation Plan Revision at Part VIII, Section C[1], supra.

APPENDIX I

EPA's Ozone Nonattainment Areas[460]



[460]MONITORING AND REPORTS BRANCH, OFFICE OF AIR QUALITY PLANNING AND STANDARDS, U.S. EPA, A PRELIMINARY COMPARISON OF 1988 OZONE CONCENTRATIONS TO 1983 AND 1987 OZONE CONCENTRATIONS, Figure 3 (February 17, 1989).

APPENDIX II

Composition of Typical Gasolines[461]

(Molecular Percentage)

Hydrocarbon	Gas A	Gas B	Gas C
Isobutane	.51	.92	.49
n-Butane & Neopentane	6.83	17.49	6.27
Isopentane	11.07	.73	.74
2,3-Dimethylbutane	1.77	.73	.74
n-Pentane	7.16	7.05	6.13
2-Methylpentane	3.17	3.73	3.81
3-Methylpentane	2.41	2.54	2.35
n-Hexane	4.24	4.56	3.95
Methylcyclopentane & 2,2,3-Dimethylpentane	1.59	2.85	2.43
2,3-Dimethylpentane & 2,2,3-Trimethylbutane	1.22	.47	.26
2,3-Dimethylpentane & 2-methylhexane	3.23	2.53	1.80
3-Methylhexane	1.97	2.80	2.15
n-Heptane	2.15	1.65	1.79
3-Ethylpentane & Iso-octane	7.08	1.00	.54
Total Paraffins	**71.10**	**66.04**	**51.55**
Benzene	2.68	1.99	2.08
Toluene	5.94	7.52	6.30
Ethylbenzene	1.13	1.29	1.50
m-Xylene & p-Xylene	3.75	1.45	4.31
o-Xylene	1.40	1.73	2.21
3-Methylethylbenzene & 4-Methylethylbenzene	1.18	1.39	1.41
t-Butylbenzene & 1,2,4-trimethylbenzene	1.31	1.51	1.40
Total Aromatics	**20.00**	**20.44**	**24.45**
trans-2-Butene	.17	.49	.56
cis-2-Butene	.10	.36	.55
1-Pentene	.30	.32	1.12
2-Methyl-butene	1.09	.53	1.77
2-Methyl-1-pentene & 3-Hexene	.33	.45	.72
2-Methyl-2-pentene	.58	.64	1.36
3-Methyl-cis-s-pentene	.35	.71	.66
Cyclohexene	.14	.32	.55
1-Heptene	.09	.20	.66
cis-3-Heptene & trans-3-Heptene	.53	.95	1.16
1-Octane & 2-ethyl-1-hexene	.00	.25	.64
2,3-Dimethyl-2Hexene & trans-2-octane	.00	.56	.82
Total Olefins	**8.90**	**13.52**	**24.21**
Total Hydrocarbons	**100.00**	**100.00**	**100.00**

[461]H. Hesketh, UNDERSTANDING AND CONTROLLING AIR POLLUTION 139 (1972).

APPENDIX III

Schedule of Seasonal and Geographic Volatility Classes[462]

State	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Alabama	D	D	D/C	C	C	C	C/B	B	B/C	C	C/D	D
Alaska	E	E	E	E	E/D	D	D	D	D/E	E	E	E
Arizona	D	D/C	C/B	B	B/A	A	A	A	A	A/B	B/C	C/D
California												
North Coast	E/D	D	D	D/C	C	C/B	B	B	B	B/C	C/D	D/E
South Coast	D	D	D/C	C	C/B	B	B	B	B	B/C	C/D	D
Southeast	D	D/C	C/B	B	B/A	A	A	A	A	A/B	B/C	C/D
Interior	E/D	D	D	D/C	C/B	B	B	B	B	B/C	C/D	D/E
Colorado	E	E/D	D/C	C	C/B	B	B/A	A/B	B	B/C	C/D	D/E
Connecticut	E	E	E/D	D	D/C	C	C	C	C/D	D	D/E	E
Delaware	E	E	E/D	D	D/C	C	C	C	C	C/D	D/E	E
District of Columbia	E	E/D	D	D/C	C	C	C	C	C	C/D	D/E	E
Florida	D	D	D/C	C	C	C	C	C	C	C	C/D	D
Georgia	D	D	D/C	C	C	C	C/B	B	B/C	C	C/D	D
Hawaii	C	C	C	C	C	C	C	C	C	C	C	C
Idaho	E	E/D	D	D/C	C/B	B	B	B	B	B/C	C/D	D/E
Illinois												
North 40 lat.	E	E	E/D	D	D/C	C	C	C	C	C/D	D/E	E
South 40 lat.	E	E	E/D	D/C	C	C	C/B	B/C	C	C/D	D	D/E
Indiana	E	E	E/D	D	D/C	C	C	C	C	C/D	D/E	E
Iowa	E	E	E/D	D/C	C	C/B	B/C	C	C	C/D	D/E	E
Kansas	E	E/D	D/C	C	C/B	B	B	B	B	B/C	C/D	D/E
Kentucky	E	E/D	D	D/C	C	C	C	C	C	C/D	D/E	E
Louisiana	D	D	D/C	C	C	C	C/B	B	B/C	C	C/D	D
Maine	E	E	E/D	D	D/C	C	C	C	C/D	D	D/E	E
Maryland	E	E	E/D	D	D/C	C	C	C	C	C/D	D/E	E
Massachusetts	E	E	E/D	D	D/C	C	C	C	C/D	D	D/E	E
Michigan	E	E	E/D	D	D/C	C	C	C	C/D	D	D/E	E
Minnesota	E	E	E/D	D	D/C	C	C	C	C	C/D	D/E	E
Mississippi	D	D	D/C	C	C	C	C/B	B	B/C	C	C/D	D
Missouri	E	E/D	D	D/C	C	C/B	B	B	B/C	C/D	D	D/E
Montana	E	E	E/D	D/C	C/B	B	B	B	B/C	C/D	D/E	E
Nebraska	E	E	E/D	D/C	C/B	B	B	B	B	B/C	C/D	D/E
Nevada												
North 38 lat.	E	E/D	D	D/C	C/B	B	B	B	B	B/C	C/D	D/E
South 38 lat.	D	D/C	C/B	B	B/A	A	A	A	A	A/B	B/C	C/D
New Hampshire	E	E	E/D	D	D/C	C	C	C	C/D	D	D/E	E

[462] Contract language would provide: "This schedule, subject to agreement between purchaser and seller, denotes the volatility properties of the gasoline at the time and place of shipment. Shipments intended for future use may anticipate this schedule. Where alternative classes are permitted, either class is acceptable; the option shall be exercised by the seller." American Society for Testing and Materials, *ASTM D439-81, Specifications for Automotive Gasoline, Table 2.*

State	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
New Jersey	E	E	E/D	D	D/C	C	C	C	C/D	D	D/E	E
New Mexico												
North 34 lat.	E/D	D	D/C	C/B	B/A	A	A	A/B	B	B/C	C/D	D
South 34 lat.	D	D/C	C/B	B	B/A	A	A	A	A/B	B/C	C/D	D
New York	E	E	E/D	D	D/C	C	C	C	C/D	D	D/E	E
North Carolina	E/D	D	D	D/C	C	C	C/B	B	B/C	C/D	D	D/E
North Dakota	E	E	E/D	D	D/C	C/B	B	B	B/C	C/D	D/E	E
Ohio	E	E	E/D	D	D/C	C	C	C	C	C/D	D/E	E
Oklahoma	E/D	D	D/C	C	C/B	B	B	B	B	B/C	C/D	D/E
Oregon												
East 122 long.	E	E/D	D	D	D/C	C/B	B	B	B/C	C/D	D	D/E
West 122 long.	E	E/D	D	D	D/C	C	C	C	C	C/D	D/E	E
Pennsylvania	E	E	E/D	D	D/C	C	C	C	C/D	D	D/E	E
Rhode Island	E	E	E/D	D	D/C	C	C	C	C/D	D	D/E	E
South Carolina	D	D	D	D/C	C	C	C/B	B	B/C	C/D	D	D
South Dakota	E	E	E/D	D/C	C/B	B	B	B	B	B/C	C/D	D/E
Tennessee	E/D	D	D	D/C	C	C	C/B	B	B/C	C/D	D	D/E
Texas												
East 99 long.	D	D	D/C	C	C	C/B	B	B	B	B/C	C/D	D
West 99 long.	D	D/C	C/B	B	B/A	A	A	A	A/B	B/C	C/D	D
Utah	E	E/D	D	D/C	C/B	B	B/A	A/B	B	B/C	C/D	D/E
Vermont	E	E	E/D	D	D/C	C	C	C	C/D	D	D/E	E
Virginia	E	E/D	D	D/C	C	C	C	C	C	C/D	D/E	E
Washington												
East 122 long.	E	E	E/D	D	D/C	C/B	B	B	B/C	C/D	D/E	E
West 122 long.	E	E	E/D	D	D/C	C	C	C	C	C/D	D/E	E
West Virginia	E	E	E/D	D	D/C	C	C	C	C	C/D	D/E	E
Wisconsin	E	E	E/D	D	D/C	C	C	C	C	C/D	D/E	E
Wyoming	D	D	E/D	D/C	C/B	B	B	B	B	B/C	C/D	D/E

APPENDIX IV

EPA's Summer 1989 RVP Standards as Proposed [p.s.i.][463]

State	May	June	July	Aug.	Sept.
Maine	10.5	10.5	10.5	10.5	10.5
New Hampshire	10.5	10.5	10.5	10.5	10.5
Vermont	10.5	10.5	10.5	10.5	10.5
Massachusetts	10.5	10.5	10.5	10.5	10.5
Rhode Island	10.5	10.5	10.5	10.5	10.5
Connecticut	10.5	10.5	10.5	10.5	10.5
New York	10.5	10.5	10.5	10.5	10.5
New Jersey	10.5	10.5	10.5	10.5	10.5
Delaware	10.5	10.5	10.5	10.5	10.5
Pennsylvania	10.5	10.5	10.5	10.5	10.5
Maryland	10.5	10.5	10.5	10.5	10.5
District of Columbia	10.5	10.5	10.5	10.5	10.5
Virginia	10.5	10.5	10.5	10.5	10.5
West Virginia	10.5	10.5	10.5	10.5	10.5
Ohio	10.5	10.5	10.5	10.5	10.5
Indiana	10.5	10.5	10.5	10.5	10.
Illinois					
North 40° lat.	10.5	10.5	10.5	10.5	10.5
Kentucky	10.5	10.5	10.5	10.5	10.5
Michigan	10.5	10.5	10.5	10.5	10.5
Wisconsin	10.5	10.5	10.5	10.5	10.5
Minnesota	10.5	10.5	10.5	10.5	10.5
Florida	10.5	10.5	10.5	10.5	10.5
Oregon					
West 122° long.	10.5	10.5	10.5	10.5	10.5
Washington					
West 122° long.	10.5	10.5	10.5	10.5	10.5
Illinois					
South 40° lat.	10.5	10.5	9.1	9.1	10.5
Iowa	10.5	9.1	9.1	10.5	10.5
North Carolina	10.5	10.5	9.1	9.1	9.1
South Carolina	10.5	10.5	9.1	9.1	9.1
Georgia	10.5	10.5	9.1	9.1	9.1
Alabama	10.5	10.5	9.1	9.1	9.1
Mississippi	10.5	10.5	9.1	9.1	9.1
Louisiana	10.5	10.5	9.1	9.1	9.1
Tennessee	10.5	10.5	9.1	9.1	9.1

[463] Table abstracted from alphabetical listing at 52 Fed. Reg. 31,314 (1987).

State	May	June	July	Aug.	Sept.
Missouri	10.5	9.1	9.1	9.1	9.1
Arkansas	10.5	9.1	9.1	9.1	9.1
Texas					
East 99° long.	10.5	9.1	9.1	9.1	9.1
North Dakota	10.5	9.1	9.1	9.1	9.1
Washington					
East 122° long.	10.5	9.1	9.1	9.1	9.1
Oregon					
East 122° long.	10.5	9.1	9.1	9.1	9.1
California					
North Coast	10.5	9.1	9.1	9.1	9.1
South Dakota	9.1	9.1	9.1	9.1	9.1
Nebraska	9.1	9.1	9.1	9.1	9.1
Kansas	9.1	9.1	9.1	9.1	9.1
Oklahoma	9.1	9.1	9.1	9.1	9.1
Montana	9.1	9.1	9.1	9.1	9.1
Idaho	9.1	9.1	9.1	9.1	9.1
Wyoming	9.1	9.1	9.1	9.1	9.1
Nevada					
North 38° lat.	9.1	9.1	9.1	9.1	9.1
California					
South Coast	9.1	9.1	9.1	9.1	9.1
Interior	9.1	9.1	9.1	9.1	9.1
Colorado	9.1	9.1	8.2	8.2	9.1
Utah	9.1	9.1	8.2	8.2	9.1
New Mexico					
North 34° lat.	8.2	8.2	8.2	8.2	9.1
New Mexico					
South 34° lat.	8.2	8.2	8.2	8.2	8.2
Texas					
West 99° long.	8.2	8.2	8.2	8.2	8.2
Arizona	8.2	8.2	8.2	8.2	8.2
Nevada					
South 38° lat.	8.2	8.2	8.2	8.2	8.2
California					
Southeast	8.2	8.2	8.2	8.2	8.2

APPENDIX V

Proposed EPA Standards Starting Summer 1992 [p.s.i.][464]

State	May	June	July	Aug.	Sept.
Maine	9.0	9.0	9.0	9.0	9.0
New Hampshire	9.0	9.0	9.0	9.0	9.0
Vermont	9.0	9.0	9.0	9.0	9.0
Massachusetts	9.0	9.0	9.0	9.0	9.0
Rhode Island	9.0	9.0	9.0	9.0	9.0
Connecticut	9.0	9.0	9.0	9.0	9.0
New York	9.0	9.0	9.0	9.0	9.0
New Jersey	9.0	9.0	9.0	9.0	9.0
Delaware	9.0	9.0	9.0	9.0	9.0
Pennsylvania	9.0	9.0	9.0	9.0	9.0
Maryland	9.0	9.0	9.0	9.0	9.0
District of Columbia	9.0	9.0	9.0	9.0	9.0
Virginia	9.0	9.0	9.0	9.0	9.0
West Virginia	9.0	9.0	9.0	9.0	9.0
Ohio	9.0	9.0	9.0	9.0	9.0
Indiana	9.0	9.0	9.0	9.0	9.0
Illinois					
North 40° lat.	9.0	9.0	9.0	9.0	9.0
Kentucky	9.0	9.0	9.0	9.0	9.0
Michigan	9.0	9.0	9.0	9.0	9.0
Wisconsin	9.0	9.0	9.0	9.0	9.0
Minnesota	9.0	9.0	9.0	9.0	9.0
Florida	9.0	9.0	9.0	9.0	9.0
Oregon					
West 122° long.	9.0	9.0	9.0	9.0	9.0
Washington					
West 122° long.	9.0	9.0	9.0	9.0	9.0
Illinois					
South 40° lat.	9.0	9.0	7.8	7.8	9.0
Iowa	9.0	7.8	7.8	9.0	9.0

[464]Table abstracted from alphabetical listing at Notice of Proposed Rulemaking, 52 Fed. Reg. 31,274, 31,315 (August 19, 1987).

State	May	June	July	Aug.	Sep.
North Carolina	9.0	9.0	7.8	7.8	7.8
South Carolina	9.0	9.0	7.8	7.8	7.8
Georgia	9.0	9.0	7.8	7.8	7.8
Alabama	9.0	9.0	7.8	7.8	7.8
Mississippi	9.0	9.0	7.8	7.8	7.8
Louisiana	9.0	9.0	7.8	7.8	7.8
Tennessee	9.0	9.0	7.8	7.8	7.8
Missouri	9.0	7.8	7.8	7.8	7.8
Arkansas	9.0	7.8	7.8	7.8	7.8
Texas					
East 99° long.	9.0	7.8	7.8	7.8	7.8
North Dakota	9.0	7.8	7.8	7.8	7.8
Washington					
East 122° long.	9.0	7.8	7.8	7.8	7.8
Oregon					
East 122° long.	9.0	7.8	7.8	7.8	7.8
California					
North Coast	9.0	7.8	7.8	7.8	7.8
South Dakota	7.8	7.8	7.8	7.8	7.8
Nebraska	7.8	7.8	7.8	7.8	7.8
Kansas	7.8	7.8	7.8	7.8	7.8
Oklahoma	7.8	7.8	7.8	7.8	7.8
Montana	7.8	7.8	7.8	7.8	7.8
Idaho	7.8	7.8	7.8	7.8	7.8
Wyoming	7.8	7.8	7.8	7.8	7.8
Nevada					
North 38° lat.	7.8	7.8	7.8	7.8	7.8
California					
South Coast	7.8	7.8	7.8	7.8	7.8
Interior	7.8	7.8	7.8	7.8	7.8
Colorado	7.8	7.8	7.0	7.0	7.8
Utah	7.8	7.8	7.0	7.0	7.8
New Mexico					
North 34° lat.	7.0	7.0	7.0	7.0	7.8
New Mexico					
South 34° lat.	7.0	7.0	7.0	7.0	7.0
Texas					
West 99° long.	7.0	7.0	7.0	7.0	7.0
Arizona	7.0	7.0	7.0	7.0	7.0
Nevada					
South 38° lat.	7.0	7.0	7.0	7.0	7.0
California					
Southeast	7.0	7.0	7.0	7.0	7.0

APPENDIX VI

EPA's RVP Standards for Summer 1989 [p.s.i.][465]

State	May	June	July	Aug.	Sept.
Maine	10.5	10.5	10.5	10.5	10.5
New Hampshire	10.5	10.5	10.5	10.5	10.5
Vermont	10.5	10.5	10.5	10.5	10.5
Massachusetts	10.5	10.5	10.5	10.5	10.5
Rhode Island	10.5	10.5	10.5	10.5	10.5
Connecticut	10.5	10.5	10.5	10.5	10.5
New York	10.5	10.5	10.5	10.5	10.5
New Jersey	10.5	10.5	10.5	10.5	10.5
Delaware	10.5	10.5	10.5	10.5	10.5
Pennsylvania	10.5	10.5	10.5	10.5	10.5
Maryland	10.5	10.5	10.5	10.5	10.5
District of Columbia	10.5	10.5	10.5	10.5	10.5
Virginia	10.5	10.5	10.5	10.5	10.5
West Virginia	10.5	10.5	10.5	10.5	10.5
Ohio	10.5	10.5	10.5	10.5	10.5
Indiana	10.5	10.5	10.5	10.5	10.5
Illinois	10.5	10.5	10.5	10.5	10.5
North 40° lat.					
Kentucky	10.5	10.5	10.5	10.5	10.5
Michigan	10.5	10.5	10.5	10.5	10.5
Wisconsin	10.5	10.5	10.5	10.5	10.5
Minnesota	10.5	10.5	10.5	10.5	10.5
North Dakota	10.5	10.5	10.5	10.5	10.5
South Dakota	10.5	10.5	10.5	10.5	10.5
Iowa	10.5	10.5	10.5	10.5	10.5
Nebraska	10.5	10.5	10.5	10.5	10.5
Montana	10.5	10.5	10.5	10.5	10.5
Wyoming	10.5	10.5	10.5	10.5	10.5
Idaho	10.5	10.5	10.5	10.5	10.5
Oregon	10.5	10.5	10.5	10.5	10.5
East 122° long.					
West 122° long.					
Washington	10.5	10.5	10.5	10.5	10.5
East 122° long.					
West 122° long.					
Florida	10.5	10.5	10.5	10.5	10.5

[465]Table abstracted from alphabetical listing, **Controls and Prohibitions on Gasoline Volatility**, 40 C.F.R. § 80.27 (1989). Northern New Mexico standard as revised by Notice of Final Rulemaking, *Volatility Regulations for Gasoline and Alcohol Blends Sold in Calendar Years 1989 and Beyond*, 54 Fed. Reg. 33,218, 33,219 (August 14, 1989).

State	May	June	July	Aug.	Sept.
Alabama	10.5	10.5	9.5	9.5	10.5
Arkansas	10.5	10.5	9.5	9.5	10.5
Georgia	10.5	10.5	9.5	9.5	10.5
Illinois South 40° lat.	10.5	10.5	9.5	9.5	10.5
Kansas	10.5	10.5	9.5	9.5	10.5
Louisiana	10.5	10.5	9.5	9.5	10.5
Mississippi	10.5	10.5	9.5	9.5	10.5
Missouri	10.5	10.5	9.5	9.5	10.5
North Carolina	10.5	10.5	9.5	9.5	10.5
South Carolina	10.5	10.5	9.5	9.5	10.5
Tennessee	10.5	10.5	9.5	9.5	10.5
California North Coast	10.5	9.5	9.5	9.5	9.5
Colorado	10.5	9.5	9.5	9.5	9.5
Nevada North 38° lat.	10.5	9.5	9.5	9.5	9.5
Oklahoma	10.5	9.5	9.5	9.5	9.5
Texas East 99° long.	10.5	9.5	9.5	9.5	9.5
Utah	10.5	9.5	9.5	9.5	9.5
California South Coast Southeast Interior	9.5	9.5	9.5	9.5	9.5
Nevada South 38° lat.	9.5	9.5	9.5	9.5	9.5
New Mexico North 34° lat.	9.5	9.0	9.0	9.5	9.5
Arizona	9.5	9.0	9.0	9.0	9.5
New Mexico South 34° lat.	9.5	9.0	9.0	9.0	9.5
Texas West 99° long.	9.5	9.0	9.0	9.0	9.5

APPENDIX VII

NESCAUM Memorandum of Understanding

APPENDIX VIII

EPA's RVP Standards for Summer 1992 et. seq. [p.s.i.][466]

State	May	June	July	Aug.	Sept.
Maine	9.0	9.0	9.0	9.0	9.0
New Hampshire	9.0	9.0	9.0	9.0	9.0
Vermont	9.0	9.0	9.0	9.0	9.0
Massachusetts	9.0	9.0	9.0	9.0	9.0
Rhode Island	9.0	9.0	9.0	9.0	9.0
Connecticut	9.0	9.0	9.0	9.0	9.0
New York	9.0	9.0	9.0	9.0	9.0
New Jersey	9.0	9.0	9.0	9.0	9.0
Delaware	9.0	9.0	9.0	9.0	9.0
Pennsylvania	9.0	9.0	9.0	9.0	9.0
West Virginia	9.0	9.0	9.0	9.0	9.0
Ohio	9.0	9.0	9.0	9.0	9.0
Indiana	9.0	9.0	9.0	9.0	9.0
Illinois	9.0	9.0	9.0	9.0	9.0
Kentucky	9.0	9.0	9.0	9.0	9.0
Michigan	9.0	9.0	9.0	9.0	9.0
Wisconsin	9.0	9.0	9.0	9.0	9.0
Minnesota	9.0	9.0	9.0	9.0	9.0
Iowa	9.0	9.0	9.0	9.0	9.0
North Dakota	9.0	9.0	9.0	9.0	9.0
South Dakota	9.0	9.0	9.0	9.0	9.0
Nebraska	9.0	9.0	9.0	9.0	9.0
Montana	9.0	9.0	9.0	9.0	9.0
Idaho	9.0	9.0	9.0	9.0	9.0
Wyoming	9.0	9.0	9.0	9.0	9.0
Washington	9.0	9.0	9.0	9.0	9.0
Maryland	9.0	7.8	7.8	7.8	7.8
District of Columbia	9.0	7.8	7.8	7.8	7.8
Virginia	9.0	7.8	7.8	7.8	7.8
North Carolina	9.0	7.8	7.8	7.8	7.8
South Carolina	9.0	7.8	7.8	7.8	7.8
Georgia	9.0	7.8	7.8	7.8	7.8
Florida	9.0	7.8	7.8	7.8	7.8
Alabama	9.0	7.8	7.8	7.8	7.8
Mississippi	9.0	7.8	7.8	7.8	7.8
Tennessee	9.0	7.8	7.8	7.8	7.8
Missouri	9.0	7.8	7.8	7.8	7.8
Arkansas	9.0	7.8	7.8	7.8	7.8

[466] Table is abstracted from alphabetical listing in Notice of Final Rulemaking, *Volatility Regulations for Gasoline and Alcohol Blends Sold in Calendar Years 1992 and Beyond*, 55 Fed. Reg. 23,658, 23,667 (June 11, 1990).

State	May	June	July	Aug.	Sept.
Louisiana	9.0	7.8	7.8	7.8	7.8
Kansas	9.0	7.8	7.8	7.8	7.8
Oklahoma	9.0	7.8	7.8	7.8	7.8
Texas	9.0	7.8	7.8	7.8	7.8
Colorado	9.0	7.8	7.8	7.8	7.8
New Mexico	9.0	7.8	7.8	7.8	7.8
Utah	9.0	7.8	7.8	7.8	7.8
Arizona	9.0	7.8	7.8	7.8	7.8
Oregon	9.0	7.8	7.8	7.8	7.8
Nevada	9.0	7.8	7.8	7.8	7.8
California	9.0	7.8	7.8	7.8	7.8

APPENDIX IX

Equivalent Emission RVP Calculations[467]

State	May	June	July	August	Sept.
Maine	9.8	10.0	9.6	9.3	10.1
New Hampshire	10.0	9.9	9.4	9.5	10.2
Vermont	10.0	9.8	9.5	9.3	10.2
Massachusetts	9.6	9.8	9.6	9.3	9.8
Rhode Island	9.3	9.6	9.4	9.3	9.9
Connecticut	9.4	9.5	8.7	8.9	10.2
New York	9.1	9.2	8.8	9.3	9.6
New Jersey	8.3	8.2[468]	8.8	8.8	9.7
Pennsylvania	9.5	9.2	9.0	9.3	10.0
Delaware	9.5	9.0	8.6	9.1	9.5
Ohio	9.7	9.5	9.2	9.3	9.8
Indiana	9.6	8.9	9.0	9.3	9.6
Illinois	9.7	8.8	8.8	8.9	9.6
Michigan	9.5	9.4	8.9	9.5	9.9
Wisconsin	9.5	8.5	9.3	9.8	9.6
Maryland	9.2	8.9	8.4	8.5	9.5
District of Columbia[469]	8.9	9.3	8.3	8.4	9.0
Virginia	8.9	9.3	8.3	8.4	9.0
West Virginia	9.6	9.6	8.8	8.9	9.7
North Carolina	9.6	8.6	7.9	8.1	9.6
South Carolina	9.4	8.3	7.5	8.0	9.4
Georgia	9.4	8.2	7.7	8.2	9.3
Florida	8.9	8.1	8.2	7.9	8.5
Alabama	9.6	8.2	7.9	7.9	9.1
Mississippi	9.5	8.4	7.6	7.9	8.9
Louisiana	9.5	8.6	8.0	8.1	8.6
Texas	9.2	8.4	7.7	7.6	8.3
Kentucky	9.5	9.3	8.6	8.8	9.6
Tennessee	9.6	8.7	7.9	8.1	9.2

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[467] U.S. ENVIRONMENTAL PROTECTION AGENCY, FINAL REGULATORY IMPACT ANALYSIS AND SUMMARY AND ANALYSIS OF COMMENTS: PHASE II GASOLINE VOLATILITY REGULATIONS, Table 2-2, p. 2-8 (May 1990) (available in EPA Docket A-85-21 at V-B-2).

[468] Recalculated to eliminate disproportionate impact of New York City.

[469] Insufficient data led EPA to assign RVP's calculated for Virginia.

State	May	June	July	August	Sep.
Arkansas	9.3	8.6	7.9[470]	7.9	8 . 7
Minnesota	9.7	8.7	9.2	9.8	---
Iowa	9.7	8.8	8.4	9.2	9.6
Missouri	9.6	8.7	8.0	8.8	9.2
North Dakota	9.9	9.9	9.9	9.9	9.9
South Dakota	9.4	9.4	9.4	9.4	9.4
Nebraska	9.8	8.5	8.4	9.3	9.4
Kansas	9.8	8.5	7.7	8.3	8.6
Oklahoma	9.5	9.1	7.9	8.0	8.8
Montana	9.8	9.8	9.8	9.8	9.8
Wyoming	9.7	9.7	9.7	9.7	9.7
Colorado	9.1	7.6	7.0	7.4	9.0
Idaho	8.8	8.8	8.8	8.8	8.8
Washington	10.0	9.6	9.3	9.2	10.0
Oregon	8.9	8.6	8.0	7.8	9.1
Utah	8.9	7.1	7.0	7.0	8.4
Nevada	7.7	7.0	7.0	7.0	7.9
New Mexico	9.2	7.8	7.0	7.1	8.9
Arizona	7.0	7.0	7.0	7.0	7.0
California[471]	8.7	8.0	7.5	7.6	8.2

[470]The only nonattainment area in Arkansas is located in the Memphis AQCR. Tennessee's July RVP was substituted for higher RVP obtained by calculating statewide Arkansas average temperature.

[471]California's RVP values as readjusted by EPA.

APPENDIX X

Equivalent Emission Analysis Designations[472]

State	May	June	July	Aug.	Sep.
Maine	9.0	9.0	9.0	9.0	9.0
New Hampshire	9.0	9.0	9.0	9.0	9.0
Vermont	9.0	9.0	9.0	9.0	9.0
Massachusetts	9.0	9.0	9.0	9.0	9.0
Rhode Island	9.0	9.0	9.0	9.0	9.0
Connecticut	9.0	9.0	9.0	9.0	9.0
New York	9.0	9.0	9.0	9.0	9.0
New Jersey	9.0	9.0	9.0	9.0	9.0
Delaware	9.0	9.0	9.0	9.0	9.0
Pennsylvania	9.0	9.0	9.0	9.0	9.0
West Virginia	9.0	9.0	9.0	9.0	9.0
Ohio	9.0	9.0	9.0	9.0	9.0
Indiana	9.0	9.0	9.0	9.0	9.0
Illinois	9.0	9.0	9.0	9.0	9.0
Kentucky	9.0	9.0	9.0	9.0	9.0
Michigan	9.0	9.0	9.0	9.0	9.0
Wisconsin	9.0	9.0	9.0	9.0	9.0
Minnesota	9.0	9.0	9.0	9.0	9.0
Iowa	9.0	9.0	9.0	9.0	9.0
North Dakota	9.0	9.0	9.0	9.0	9.0
South Dakota	9.0	9.0	9.0	9.0	9.0
Nebraska	9.0	9.0	9.0	9.0	9.0
Montana	9.0	9.0	9.0	9.0	9.0
Idaho	9.0	9.0	9.0	9.0	9.0
Wyoming	9.0	9.0	9.0	9.0	9.0
Washington	9.0	9.0	9.0	9.0	9.0
Maryland	9.0	9.0	7.8	9.0	9.0
District of Columbia	9.0	9.0	7.8	7.8	9.0
Virginia	9.0	9.0	7.8	7.8	9.0

[472] Figure abstracted from alphabetical listing in, U.S. ENVIRONMENTAL PROTECTION AGENCY, FINAL REGULATORY IMPACT aNALYSIS AND SUMMARY AND ANALYSIS OF COMMENTS: PHASE II GASOLINE VOLATILITY REGULATIONS, Table 2-3, p. 2-8 (May 1990)(available in EPA Docket A-85-21 as document V-B-2).

State	May	June	July	Aug.	Sept.
North Carolina	9.0	7.8	7.8	7.8	9.0
South Carolina	9.0	7.8	7.8	7.8	9.0
Georgia	9.0	7.8	7.8	7.8	9.0
Florida	9.0	7.8	7.8	7.8	9.0
Alabama	9.0	7.8	7.8	7.8	9.0
Mississippi	9.0	7.8	7.8	7.8	9.0
Tennessee	9.0	7.8	7.8	7.8	9.0
Missouri	9.0	7.8	7.8	7.8	9.0
Arkansas	9.0	7.8	7.8	7.8	9.0
Louisiana	9.0	7.8	7.8	7.8	9.0
Kansas	9.0	7.8	7.8	7.8	9.0
Oklahoma	9.0	7.8	7.8	7.8	9.0
Colorado	9.0	7.8	7.8	7.8	9.0
New Mexico	9.0	7.8	7.8	7.8	9.0
Oregon	9.0	7.8	7.8	7.8	9.0
Texas	9.0	7.8	7.8	7.8	7.8
Nevada	9.0	7.8	7.8	7.8	7.8
California	9.0	7.8	7.8	7.8	7.8
Utah	9.0	7.0	7.0	7.0	7.0
Arizona	9.0	7.0	7.0	7.0	7.0